6070A
6071A

Synthesized RF Signal Generators

Service Manual

PROPERTY OF:
JOHN FLUKE MFG. CO., INC
3740 INDUSTRIAL AVENUE
ROLLING MEADOWS, IL 60008
(312) 392-9510
MODEL: 6071A MANUAL
S/N: 3170019
D2JN3
DEMO

FLUKE®

NOTE

This manual documents the Model 6070A/6071A and its assemblies at the revision levels shown in Appendix A. If your instrument contains assemblies with different revision letters, it will be necessary for you to either update or backdate this manual. Refer to the supplemental change/errata sheet for newer assemblies or to the backdating sheet in Appendix A for older assemblies.

6070A
6071A

Synthesized RF Signal Generators

Service Manual

P/N 578054
JANUARY 1982
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John Fluke Mfg. Co., Inc., P.O. Box C9090, Everett, Washington 98206

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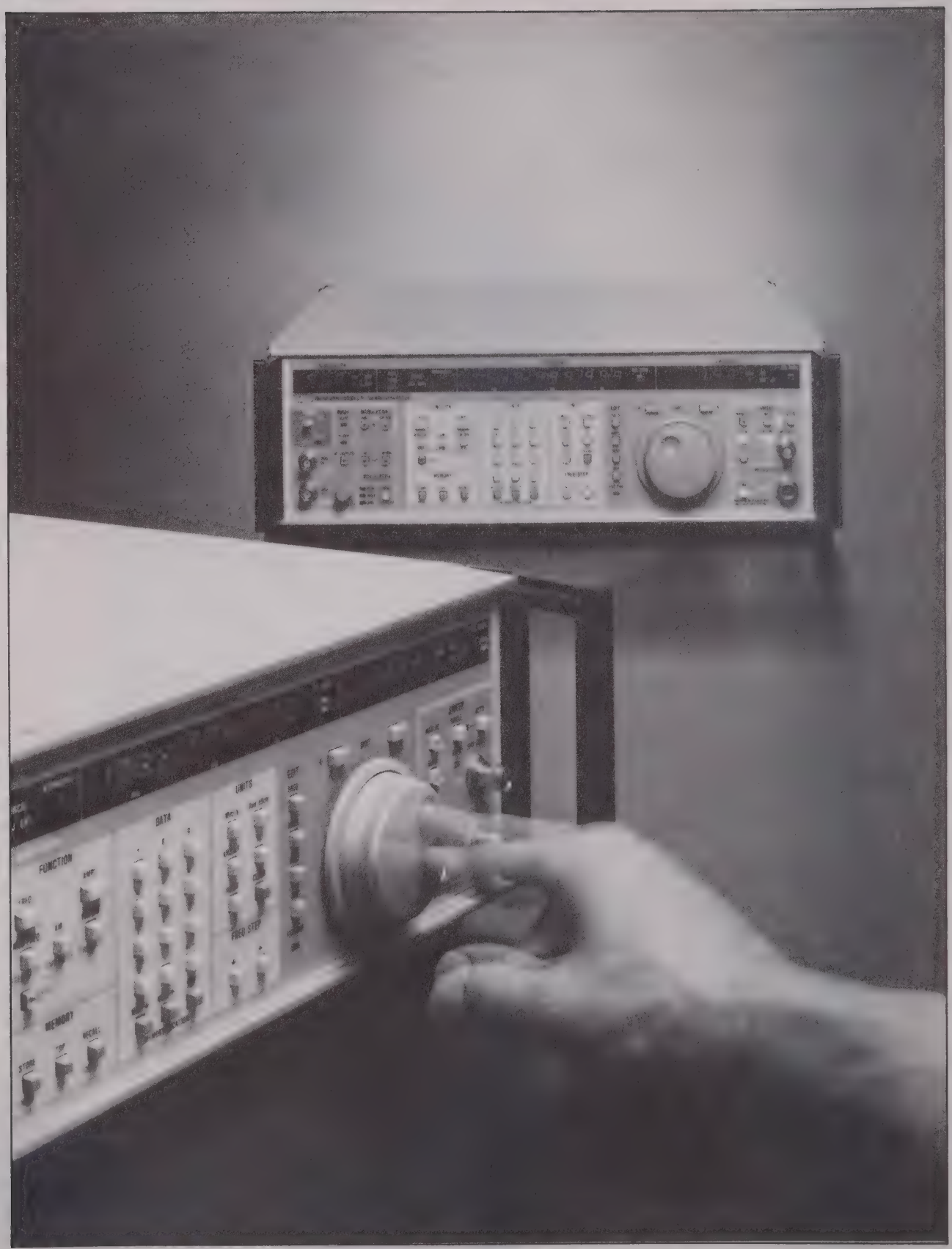


6070A/6071A Synthesized RF Signal Generators

Section 1
Introduction

1-1. THE MANUAL SET

1-2. The John Fluke Models 6070A and 6071A RF Synthesized Signal Generators are documented by a set of four manuals: the 6070A/6071A Operator Manual, the 6070A/6071A Calibration Manual, the 6070A/6071A Service Manual, and the 6070A/6071A Schematics Manual, (Figure 1-1). The 6070A/6071A Operator Manual introduces the instrument; familiarizes the operator with all instrument controls, connections, and indicators: and presents detailed operating information. The 6070A/6071A Calibration Manual provides procedures for general maintenance, performance checks, and calibration adjustments. The 6070A/6071A Service Manual describes the theory of operation and troubleshooting and includes a list of replaceable parts. The 6070A/6071A Schematic Manual contains a functional block diagram, a wiring diagram, and all schematic diagrams of the instrument.

1-3. The major difference between the 6070A and the 6071A is that the 6071A has twice the upper frequency limit of the 6070A. Because of the similarity of the models, most of the text in this manual applies to both the 6070A and the 6071A. Text that applies to just the 6070A or just the 6071A is identified as such.

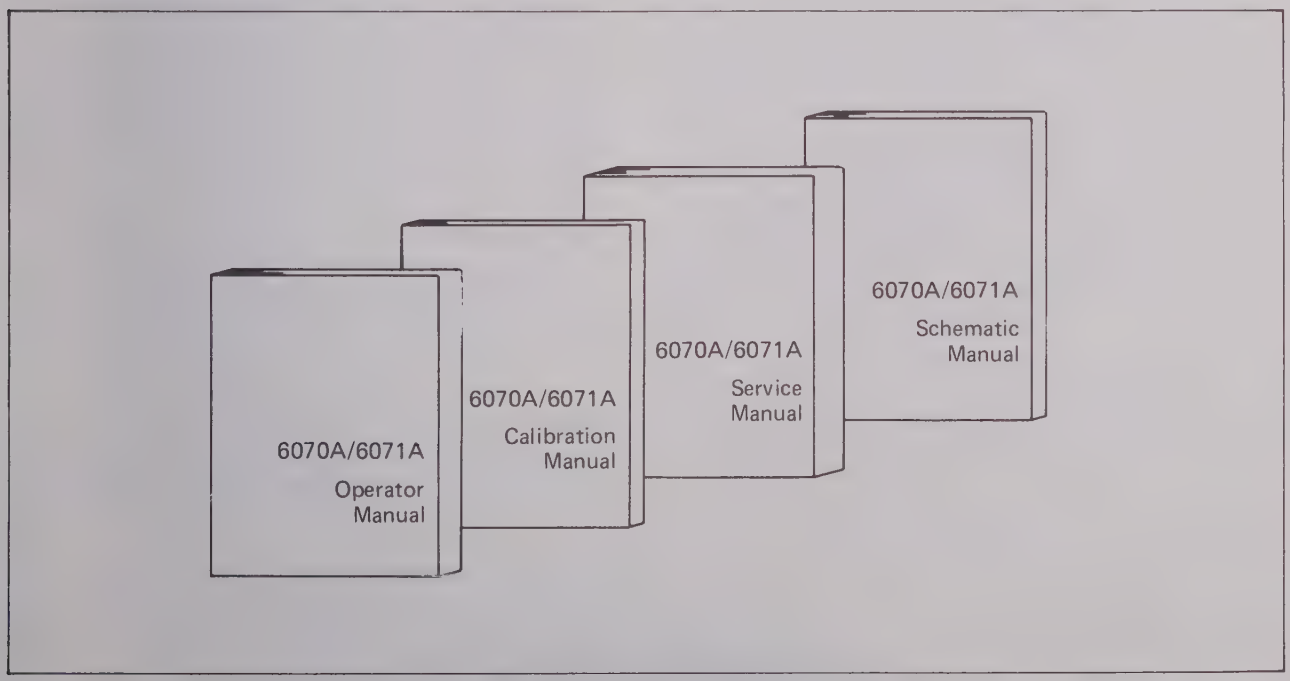


Figure 1-1. 6070A/6071 Instruction Manual Set

1-4. THE 6070A/6071A SERVICE MANUAL

1-5. The information in this, the 6070A/6071A Service Manual, is divided into eight sections:

1 INTRODUCTION
Introduces the 6070A/6071A Instruction Manual set and the 6070A/6071A Service Manual.

2 THEORY OF OPERATION
Describes the theory of operation under three headings: Software, Theory of Operation, and Circuit Analysis.

3 ACCESS PROCEDURE
Describes the procedures necessary to gain access to each major assembly and to gain access to each circuit board inside the instrument.

4 TROUBLESHOOTING
Contains troubleshooting information that aids the technician in locating an indicated trouble to a particular assembly.

5 NONROUTINE ADJUSTMENT PROCEDURE
Describes Non-routine Adjustment Procedures. These maintenance procedures are usually performed after removal and replacement of circuit board components.

6 LIST OF REPLACEABLE PARTS
Contains the list of replaceable parts for the 6070A and the 6071A.

7 OPTIONS
Contains the Options Access Procedures.

8 BACKDATING
Contains addenda and manual change information.

1-6. LIST OF RECOMMENDED TEST EQUIPMENT

1-7. The test equipment recommended for servicing the 6070A/6071A is listed in Section 1 of the 6070A/6071A Calibration Manual. If the recommended test equipment is not available, equivalent test equipment can be used.

1-8. 6070A/6071A SPECIFICATIONS

1-9. The 6070A/6071A specifications are contained in Section 1 of the Calibration Manual.

1-10. FLUKE SALES AND SERVICE CENTERS

1-11. A list of Fluke Sales and Service Centers is located in Appendix A of the 6070A/6071A Calibration Manual.

1-12. SHIPPING AND SERVICE INFORMATION

1-13. Shipping and service information is contained in Section 2 of the 6070A/6071A Calibration Manual.

Section 2
Theory of Operation

2-1. INTRODUCTION

2-2. This section describes the theory of operation of the Models 6070A and 6071A RF Synthesized Signal Generators. The text is divided into three major headings: Software Operation, Hardware Operation, and Detailed Circuit Descriptions. The Software Operation material provides a general description of the software and a description of how the software controls the hardware. The Hardware Operation material provides a general description of the hardware. The Detailed Circuit Description material provides more detailed description of the more complex circuits.

2-3. SOFTWARE OPERATION

2-4. Introduction

2-5. The 6070A and the 6071A are completely programmable via the IEEE-488 compatible interface. The IEEE-488 messages not only duplicate the function of all front panel controls (Except POWER, CLEAR DATA, and MOD OUT) but also command instrument functions not available from the front panel controls.

2-6. Data can be rapidly transferred between the IEEE-488 compatible interface and the signal generator memory. Characters can be processed as received or as a string, at the programmer's discretion. Serial poll service requests can be selectively masked as needed.

2-7. The interface features front panel monitoring of remote, address, and SRQ status. The bus address can be displayed for use in setting rear panel address switches or checking the current bus address.

2-8. The programming format corresponds closely to that used for manual front panel control, making remote operation easy for systems applications. The 6070A/6071A Operator Manual delineates the programming format.

2-9. Both the 6070A and 6071A rely on a 16-bit microprocessor (Texas Instruments, Inc., TMS 9900) to provide special instrument functions and to perform a variety of self-tests. When the instrument is turned on, the microprocessor controller enables the 6070A/6071A to automatically perform a functional self-check, then go to programmed safe power-up setups. The optional nonvolatile memory enables the instrument to turn on at the previous power-down settings. Other special functions, under control of the controller, allow the user to test the instrument's displays and annunciators, to run a pattern-random-access memory check, to check the nonvolatile memory, and to set or reset the status request line.

2-10. The internal controller also alerts the operator when an invalid entry or a parameter outside the instrument's specified range has been programmed. If an incorrect entry is attempted, the entry is rejected and annunciated. The error can be displayed and identified by pushing an interrogate button. If the user programs a parameter outside of the instruments specified range, this is also annunciated. Pushing the interrogate button causes the appropriate error code to be displayed. See the pullout card located beneath the front panel or Section 5E of the 6070A 6071A Operator Manual for error code interpretation.

2-11. The 6070A and 6071A each contain a built-in memory that allows up to nine (50 with the nonvolatile memory option) front-panel setups and test sequences to be stored and recalled. Test sequences may be stepped through one memory location at a time. An editing feature allows the insertion or deletion of program steps during development. In all, each instrument contains 32K bytes of program read-only memory (RAM), 2K bytes of random-access memory (ROM), a 16K bytes of erasable PROM, the IEEE-488 interface logic, an input/output port and interrupt-handler chip, and the power-on and clock circuitry.

2-12. Software Function

2-13. The system software performs three main functions:

1. It implements a collection of user-programmable functions that are directed towards signal-generator applications.

2. It selects and configures the appropriate hardware building blocks to produce the required output and then linearizes and compensates the signal path to optimize quality and resolution.

3. It implements an extensive set of self-test and diagnostic functions.

2-14. The software package operates as a simple timesharing system where the different instrument functions use the resources of a common CPU in an independent fashion but share communication links and utility routines.

2-15. Software at Work

2-16. At power-on, the software performs instrument self-checking and initializes both the RAM and the instrument hardware at power-on. Then the operating system is booted by loading a RAM-based task table from ROM. The task table contains six frames, each consisting of four words and each word corresponding to a task. The first word points to the microprocessor register workspace in RAM, the second points to the task-program counter, the third contains the processor status word, and the fourth points to the task stack. Once the task table is initialized, multitasking is initiated and the operating system is invoked. The instrument is now fully operational.

2-17. At the heart of the operating system is the task scheduler. The scheduler is actually a subroutine that returns to a routine different from the one that called it. The operating system is not a typical time-slice system, where an interrupt causes transfer of control from one task to another at a predetermined rate.

2-18. In the generator the tasks execute sequentially. The transfer of control between each task happen at well defined points. The operating system supports four primitive functions: suspend, resume, and two binary operations on semaphores, P and V, that implement mutual exclusion.

2-19. The suspend function is a call to the scheduler to save the current task frame in the task table. Because the scheduler operates in a round-robin fashion the suspension of a task always triggers the resumption of the next task in the queue. When invoking the suspend operation, a task may specify a period of time during which it cannot be activated. For example, if the sweep task wants to lift the recorder pen to retrace, it merely commands the pen to lift and then suspends for a period of 200 ms.

2-20. The resume operation performed by the scheduler involves the restoration of the workspace pointer, program counter, status register, and stack pointer for the next task.

2-21. The final two operations are used to resolve contention problems when a task's objective is to update a critical item without interfering with the data until the task is through updating the item. To do so, critical data items are recognized and assigned semaphores in the software design phase. When the generator is running, the state of these semaphores is controlled by the two operations: P, the block operation, and V, the unblock operation. These operations are shown in Table 2-1.

2-22. Each of these operations are time-indivisible. The P operation is sufficient to block access by other tasks, while the V operation unblocks the data. It should be noted that these operations are implemented with very few statements.

2-23. Software Management of the Hardware

2-24. INTRODUCTION

2-25. The following paragraphs give an overall view of how the hardware is managed by the software. The operating software controlled by the IEEE-488 interface is discussed in the Operator Manual.

2-26. SPECIAL FUNCTION ENTRIES

2-27. Special function entries allow the operator to control some special features of the 6070A and 6071A. There are ten classes of special functions. The special functions are described in detail in Section 5E of the 6070A/6071A Operator Manual.

Table 2-1. Semaphore Operations

```
P$   abs   s     ;tests and makes positive (block access)
     jlt   G$    ;if data was unblocked, jump to continue
     suspend     ;else access is blocked, suspend
     jmp   P$    ;loop back and check again
G$               ;continue

V$   seto  s     ;make s negative (unblock)
```

2-28. To make a special functional entry the operator presses SHIFT and then presses two digits. The first digit specifies the special function class and the second digit specifies the mode of the particular special function. The digits appear in the center of the frequency display. The second digit of the special function entry terminates the entry and returns the instrument to the entry mode corresponding to the last function prefix specified.

2-29. FREQUENCY RANGES

2-30. The frequency range of the 6070A is broken into seven bands. The 6071A has an additional four bands to double the frequency range. Table 2-2 lists the frequency band ranges.

2-31. For all keyboard entries, the instrument autoranges to select the appropriate band. When editing frequency with the knob, the instrument also autoranges unless the fixed range mode is enabled. If fixed range is enabled, the operator may edit frequency only within the confines of the current frequency band, plus an overrange above and below the band endpoints (see Table 2-2). This allows the instrument to be operated around a band switch point without changing ranges (and thus producing an output transient). Note that fixed range applies only to the edit knob, so that reprogramming frequency via the keyboard while fixed range is in effect will still redefine the current band.

2-32. FREQUENCY PROGRAMMING

2-33. Frequency programming is a multi-step process. Because the modulation and amplitude hardware is frequency dependent and must be reprogrammed whenever frequency changes, frequency programming can alter nearly every hardware setting within the instrument.

2-34. The first step in frequency programming is to add the offset frequency to the non-displayed base frequency to produce the new desired output frequency. If this output frequency is within the absolute hardware capabilities of the instrument, it is then coverted into a frequency band number and an equivalent fundamental frequency. All output frequencies originate as a fundamental frequency in the range of 250 ro 520 MHz. This fundamental frequency is then divided by 1, 2, 4, or heterodyned to produce the desired output. In the 6071A the fundamental frequency is doubled to produce the 520 MHz to 1040 MHz band.

2-35. If fixed range is in effect and the knob is used to edit frequency, then the frequency band is fixed at its current value. If the new frequency cannot be accomodated within the current band (or its overrange window), it will not be programmed (see Table 2-2).

2-36. The frequency uncal status condition is set whenever the frequency synthesis hardware is forced into an overrange region. This can occur idependently or in combination with the times two band filters. the frequency band (Mod Divider filters), or the fundamental frequency synthesizer. Each has an associated binary weighting factor in the uncal code.

2-37. The next step in frequency programming is the updating of uncal status regarding AM modulation rate limitations. Since the maximum AM modulation rate is a function of frequency, it is possible to exceed this limitation when a frequency change occurs.

2-38. Angle modulation hardware is updated next. Because this hardware is closely tied to the frequency synthesis circuitry, a change in frequency programming (especially a change in Mod Divider band or a crossing of the het band boundary) may require a complete reprogramming of modulation control bits. This step is omitted if angle modulation is disabled, as this step would have no effect on the output of the instrument.

Table 2-2. Frequency Band Ranges

	UNDER RANGE	CALIBRATED MINIMUM	CALIBRATED MAXIMUM	OVER RANGE
(6070A and 6071A)	(0.1)	0.2	62.499999	(64.999999)
	(60.0)	62.5	89.999999	(91.999999)
	(87.0)	90.0	124.999999	(126.999999)
	(120.0)	125.0	179.999999	(184.999999)
	(175.0)	180.0	249.999999	(254.999999)
	(254.0)	250.0	359.999999	(364.999999)
	(355.0)	360.0	519.999999	(525.999999)
(6071A ONLY)	(500.0)	520.0	599.999998	(619.999998)
	(580.0)	600.0	719.999998	(729.999998)
	(710.0)	720.0	874.999998	(894.999998)
	(855.0)	875.0	1039.999998	(1051.999998)

2-39. At this point the actual programming of frequency hardware takes place in terms of the equivalent fundamental frequency. The output sequence is chosen to minimize transients when changing from one frequency to another. The A4A7 Output Amplifier or the A4A6 Times Two Output Amplifier is programmed early in the sequence since it may involve the switching of a relay. This is followed by programming of the A4A4 Modulator Divider band code. Next the KV, CULC, and KN DACs are updated, the PI bits are programmed, and the PH and NI DACs are given new values. The A3A4 N/1 Divider and theA3A7 Sub-Synthesizer are programmed to the fundamental frequency minus a 201-kHz offset. The low-order 4 digits are programmed in BCD, followed by 1 digit in 9's complement, BCD followed by 1 1/4 BCD digits. The remaining digits are programmed in a BCD code.

2-40. The final step is calculation of an amplitude correction factor for the new frequency. This factor compensates for level inaccuracies which are frequency dependent. Paragraph 2-41 discusses the amplitude correction process in detail.

2-41. AMPLITUDE PROGRAMMING

2-42. Amplitude is programmed using a 23 step-(6 dB per step) attentuator, a switched 6 dB amplifier, and a 12-bit vernier DAC. In general the value of the output amplitude can be represented by the following expression:

$$\text{Amplitude (volts)} = 2^{n}D/1840$$

2-43. Where D = (uncorrected DAC) * (interpolated, normalized correction factor) and n = the total amount of attentuation as an integer multiple of 6 dB (ranges from 1 to −23).

2-44. If the amplitude is greater than 13 dBm when the frequency is below 520 MHz (or 6.9 dBm if the frequency is above 520 MHz), then n is positive and the 6 dB amplifier is turned on. Otherwise n is zero for amplitudes between 7.1 dBm and 13 dBm below 520 MHz (or 1.0 and 6.9 dBm above 520) or negative at or below 6.9 dBm below 520 MHz (or below 0.9 dBm above 520 MHz). If AM is on, the amplitude range corresponding to each n is 6 dB lower than stated above.

2-45. The amplitude correction is a factor which compensates for level inaccuracies and is a function of frequency and attenuator setting. For example, the output circuitry exhibits increasing attenuation as a function of frequency. The amplitude correction compensates for this by increasing the amplifier gain accordingly. Likewise, the amplitude correction can compensate for absolute errors in the attentuator pads because each pad combination is characterized separately in the matrix of correction factors.

2-46. Correction factors are 8-bit unsigned positive integers. They are stored in the calibration EPROM is a 25 by 25 matrix so that they may be changed when the instrument is serviced or calibrated. These correction factors are calculated values based on individual measurements of each attenuator section. In addition to the 25 by 25 matrix of correction integers, there is a single offset variable also stored in the EPROM.

2-47. The first step in programming amplitude is to calculate the attenuator (or amplifier) setting. This calculation is based on the value of the output amplitude. The calculation remains unchanged regardless of the magnitude of the amplitude loss correction and only depends on whether or not the output frequency is below 520 MHz. This feature not only lengthens the life of the attentuator relays, but also makes the output much more usable and freer of transients because the attenuator relays are not exercised when frequency is changed unless the 520-MHz boundary is crossed.

2-48. For the calculated attenuator setting, the corresponding EPROM correction factor is added to the offset, and a piecewise linear interpolation is then performed between two frequency points to obtain the interpolated correction value. The interpolation is carried out with 10-bit resolution to minimize the step size as the correction value increases. The interpolated correction is then normalized and used to compute the corrected DAC value.

2-49. The amplitude DAC has 12 bits of resolution. It can be thought of as being divided into different level segments. The top 7 dB covers the DAC values between 4095 (max DAC value) and 1840, the next 6 dB covers the values 1839 to 920, the next 6 dB covers the values 919 to 460, and so on.

2-50. The top 7 dB segment is reserved for amplitude correction. The normal amplitude vernier uses the next 6-dB segment when AM is off and the second 6-dB section when AM is on. The output amplitude of the instrument is considered to be calibrated (quality is guaranteed) whenever the uncorrected DAC falls within the range of 1840 to 460.

2-51. The absolute minimum value the DAC can assume is 100 (38 mV) and is based on the minimum level the level detector can track. If the amplitude selected requires the DAC to assume values greater than 4095 or less than 100, the DAC is programmed to 4095 or 100 and the AMPL UNCAL annunciator is flashed.

2-52. The sequence in which the attentuators (or amplifier) and DAC are programmed is important. To prevent amplitude overshoots that could damage external circuitry, the 6070A and 6071A first program the combination of the current and previous attentuation

followed by the current DAC setting, followed by the current attentuator setting. This sequence of amplitude programming can cause up to 6-dB undershoot (except when the relay contacts are in transient), but no overshoot.

2-53. AMPLITUDE MODULATION PROGRAMMING

2-54. The 6070A and 6071A allow amplitude modulation depth programming from 0 to 99.9 percent with 0.1 percent resolution. Amplitude modulation depth can be programmed either through a front panel button entry, remote IEEE bus, or front panel knob. When the combination of signal amplitude and AM depth exceeds 19 dBm peak (13 dBm for fout > 520 MHz) the AMPL UNCAL annunciator lights to warn the operator that the output amplitude is no longer guarenteed. Below 520 MHz the maximum calibrated AM depth is 89.9 percent. Above 520 MHz the maximum calibrated AM depth is 69.9 percent.

2-55. The AM modulation frequency 3-dB bandwidth points are defined as 8 kHz for output frequency $\leq$5 MHz and as 50 KHz for output frequency $\geq$5 MHz. When either condition is violated with AM enabled, the modulation frequency MOD UNCAL annunciator lights.

2-56. Amplitude modulation depth is programmed using a 10 bit DAC, with 1000 on the DAC corresponding to 100 percent AM.

2-57. ANGLE MODULATION PROGRAMMING

2-58. Angle modulation is displayed in the 6070A/6071A front panel MODULATION display field with three digits of resolution. This display field is also shared by modulation frequency and amplitude modulation. To select and display angle modulation, the operator must press the angle modulation function prefix button FM/ØM.

2-59. The instrument allows both frequency modulation (FM) and phase modulation (ØM). Frequency modulation is displayed with kHz "DEV" units and phase modulation is displayed with "Rad" units. Conversation between FM and ØM is allowed and is based upon the frequency of the internal modulation oscillator. The conversion relationship is:

$$\text{Frequency Modulation} = (\text{ØM}) * (\text{Modulation Frequency})$$

2-60. Phase modulation is programmed normalized to 10 kHz modulation frequency. This means that phase modulation is processed internally just as FM after multiplying the phase modulation index by 10 kHz to get the equivalent FM deviation.

2-61. The operator can control the angle modulation through a front panel button entry, IEEE-488 bus command, edit knob operation, or through an external signal applied to a front panel connector.

2-62. The amount of peak deviation allowed depends upon the frequency range and whether or not the center frequency is unlocked (DCFM Mode).

2-63. Programming of angle modulation is inseparable from programming of frequency modulation. The calculation of frequency and deviation parameters is handled so as to avoid conflict. Programming angle modulation uses the programmed frequency to calculate the deviation range referred to the fundamental frequency band. But programming frequency can change the deviation range which in turn determines whether or not the HI DEV mode is enabled. To avoid this fatal conflict, angle modulation is programmed in line with the frequency programming path. This means that every time angle deviation is programmed, frequency is programmed, and every time frequency is changed, angle modulation is reprogrammed, but only if angle modulation is enabled.

2-64. Since angle modulation is implemented in the synthesizer section (in the 250-MHz to 520-MHz band), the required FM depth DAC settings, FM range, and scale factor are calculated by referring the desired FM output deviation to the fundamental (250 MHz to 520 MHz) band. Tables 2-3, 2-4, and 2-5 show the FM DAC full scale, RF multiplier, FM range, and scale factor for normal (autoranging), HI DEV, and DCFM modes. The product of these four values equals the output FM full scale deviation. After obtaining these values the microprocessor calculates the FM depth DAC value as a proportion of the desired deviation to the full scale deviation. Next the processor determines whether the HI DEV mode is required (if deviation referred to the fundamental band exceeds 199 kHz.)

2-65. GENERATOR OUTPUT VALID STATUS

2-66. The output valid status is available at a rear panel connector labeled OUT VALID and also through the IEEE interface. The output valid status indicates unsettled transient conditions where the output of the instrument is impaired or unusable. It can be used to synchronize IEEE programming of the instrument with the settling of the output as a result of a previous change.

2-67. The output valid signal is a combination of hardware and software conditions. Output valid is false during the following periods of time:

1. For 50 ms after HI DEV mode is asserted.

2. From the time HI DEV is disabled until 5 ms after DDNR (Delay Discriminator Not Ready) becomes false.

3. From the time frequency is programmed when not in HI DEV mode until 5 ms after DDNR becomes false.

4. From the time frequency is programmed in the HI DEV mode until 50 ms after the frequency control data is transferred to the N/1 Divider (N1TST goes negative at the time transfer is initiated).

5. For (200 + (kHz DEV RGE)/10) ms after enabling FM.

6. For ((kHz DEV RGE)/10) ms after ranging FM, once enabled.

7. For 50/FM ms after enabling MOD OSC or ranging, once enabled (FM in kHz).

8. For 150 ms after DCFM is enabled.

2-68. INSTRUMENT SELF-TEST

2-69. The 6070A and 6071A provide extensive self-checking capabilites of their digital and analog hardware. Instrument self-tests are activated automatically at each power-on and can also be activated by selecting special function 02.

Table 2-3. FM Range (and Scale Factor) for the Normal Mode

Output FM Dev FS (kHz)		1000	500	200	100	50	20	10	5
Output ϕ Index FS (RAD)		100	50	20	10	5	2	1	0.5
FM DAC FS		1000	1000	800	1000	1000	800	1000	1000
BAND (MHz)	RF MULT.								
520-1040	2	1/2 (1)	1/4 (1)	1/10 (5/4)	1/20 (1)	1/40 (1)	1/100 (5/4)	1/100 (5/4)	1/100 (5/4)
250-520	1	1 (1)	1/2 (1)	1/4 (1)	1/10 (1)	1/20 (1)	1/40 (1)	1/100 (1)	1/100 (1)
125-250	1/2	1 (1)	1 (1)	1/2 (1)	1/4 (4/5)	1/10 (1)	1/20 (1)	1/40 (4/5)	1/100 (1)
62.5-125	1/4	1 (1)	1 (1)	1 (1)	1/2 (4/5)	1/4 (4/5)	1/10 (1)	1/20 (4/5)	1/40 (4/5)
0.2-62.5	1	1 (1)	1/2 (1)	1/4 (1)	1/10 (1)	1/20 (1)	1/40 (1)	1/100 (1)	1/100 (1)

Table 2-4. FM Range (and Scale Factor) for the HI Dev Mode

Output FM Dev FS (kHz)		1000	500	200	100	50	20	10	5
Output ϕ Index FS (RAD)		100	50	20	10	5	2	1	0.5
FM DAC FS		1000	1000	800	1000	1000	800	1000	1000
BAND (MHz)	RF MULT.								
520-1040	2	1/2 (1)	1/4 (1)	1/10 (5/4)	1/20 (1)	1/20 (1)	1/20 (1)	1/20 (1)	1/20 (1)
250-520	1	1 (1)	1/2 (1)	1/4 (1)	1/20 (1)	1/20 (1)	1/20 (1)	1/20 (1)	1/20 (1)
125-250	1/2	1 (1)	1 (1)	1/2 (1)	1/4 (4/5)	1/10 (1)	1/20 (1)	1/20 (1)	1/20 (1)
62.5-125	1/4	1 (1)	1 (1)	1 (1)	1/2 (4/5)	1/4 (4/5)	1/10 (1)	1/20 (4/5)	1/20 (4/5)
0.2-62.5	1	1 (1)	1/2 (1)	1/4 (1)	1/10 (1)	1/20 (1)	1/20 (1)	1/20 (1)	1/20 (1)

Table 2-5. FM Range (and Scale Factor) for the DCFM Mode

Output FM Dev FS (kHz)		1000	500	200	100	50	20	10	5
Output ϕ Index FS (RAD)		100	50	20	10	5	2	1	0.5
FM DAC FS		1000	1000	800	1000	1000	800	1000	1000
BAND (MHz)	RF MULT.								
520-1040	2	1/2 (1)	1/4 (1)	1/10 (5/4)	1/20 (1)	1/40 (1)	1/100 (5/4)	1/100 (5/4)	1/100 (5/4)
250-520	1	1/2 (1)	1/2 (1)	1/4 (1)	1/10 (1)	1/20 (1)	1/40 (1)	1/100 (1)	1/100 (1)
125-250	1/2	1/2 (1)	1/2 (1)	1/2 (1)	1/4 (4/5)	1/10 (1)	1/20 (1)	1/40 (4/5)	1/100 (1)
62.5-125	1/4	1/2 (4/5)	1/2 (4/5)	1/2 (4/5)	1/2 (4/5)	1/4 (4/5)	1/10 (1)	1/20 (4/5)	1/40 (4/5)
0.2-62.5	1	1/2 (1)	1/2 (1)	1/2 (1)	1/2 (1)	1/2 (1)	1/40 (1)	1/10 (1)	1/20 (1)

2-70. At power-on the instrument processor checks the program ROM checksum and the scratch pad RAM. After these two checks have been performed, the instrument can be programmed through the front panel. The instrument can be programmed through the IEEE compatible interface after all of the self-tests are complete. The following tests are performed after the ROM and RAM self-tests are completed. The test sequence is terminated immediately if any front panel button is pushed.

1. The calibration PROM checksum.

2. The IEEE circuitry is tested by writing data to the IEEE chip (U39) and verifying the data by reading it back.

3. If the nonvolatile memory is installed, each register of the nonvolatile RAM is checked with a checksum.

4. The low pass filters in the modulator/divider board are tested by setting the frequency above the cutoff and checking the unleveled indicator. This procedure checks portions of the modulator/divider, output amplifier, phase detector, N/1 divider, single sideband mizer, VCO, sub-synthesizer, and 10 MHz reference.

5. The delay discriminator is tested by stepping the frequency and then checking the delay discriminator not ready indication (Self-Test Error Code). This procedure also checks portions of the phase detector, N/1 divider, single sideband mixer, sub synthesizer, and 1-MHz reference.

6. Loopback test bits on the N/1 divider, sub-synthesizer and modulator distribution boards are checked. The loopback test bits can be both written to and read by the CPU. The processor sets these bits and then reads back the value to check that they are operating correctly. This checks portions of the cable between the CPU and the synthesizer output modules as well as the N/1 divider, sub-synthesizer, and modulation distribution printed circuit boards.

7. If the instrument is a 6071A the output amplifier is tested by programming the frequency in each of the X2 bands and verifying that the instrument is still leveled at 1 dB above the calibrated level.

8. The sub-synthesizer unlock indicator is checked by forcing a change in frequency. When this is done, the sub-synthesizer should lock again within 100 ms. This procedure also checks a portion of the 10 MHz reference.

9. Frequency modulation is checked by overmodulating the carrier and then by checking the reduce peak deviation (Error Code Indication). This checks portions of the modulation oscillator, the modulation distribution pcb, the phase detector, the N/1 divider, the single sideband mixer,

the VCO, the sub-synthesizer, and the 10 MHz reference.

10. Amplitude modulation is checked by overmodulating the carrier and then by checking the unleveled indicator. This procedure also checks portions of the modulation oscillator, modulation destribution logic, output amplifier, modulator/divider, phase detector, N/1 divider, single side band mixer, VCO, sub-synthesizer, and 10 MHz reference.

11. The Front panel buttons aren't checked at power on, but the operator can check permanently open buttons by performing special function 04. When special function 04 is invoked, each button pushed will have its row and column address displayed in the center of the frequency display field. The special function is exited by pushing the CLEAR button. Refer to the FrontPanel Control Check in the Calibration Manual.

12. The front panel displays and LEDS are not checked at power on, but can be checked any time by performing special function 03. When this is done, the microprocessor cycles through all display segments and LEDs twice. This checks for shorts between column lines and shorts between row lines. Refer to Front Panel Control Check in the Calibration Manual.

13. If one or more of the tests failed, the results of the failed test are displayed (see Section 5E of the 6070A/6071A Operator Manual).

14. The instrument then assumes its power-on status.

2-71. Self-check errors are displayed in the amplitude display field during power-on instrument identification. If the instrument fails one or more of the self-tests, the instrument model number (6070A or 6071A) appears in the FREQUENCY display and an error code indicating the test(s) failed appears in the AMPLITUDE display. For a list of error codes and interpretations refer to the Self-Test Error Code Interpretations Table in Section 5E of the 6070A/6071A Calibration Manual.

2-72. POWER-ON SETTING WITHOUT NON-VOLATILE MEMORY OPTION

2-73. When the 6070A or 6971A POWER control is set to ON, the instrument automatically sequences through a series of self tests and displays. After approximately five seconds, the front panel is set up to the programmed power-on setup unless the instrument failed one or more of the self tests. For a listing of the instrument's power-on setup, refer to Section 5 in the 6070A/6071A Calibration Manual.

2-74. POWER-ON SETTING WITH NON-VOLATILE MEMORY OPTION

2-75. If the instrument has the 6070A-570 Nonvolatile Memory Option installed the front panel is returned to the last setup before the instrument was placed in standby. If the last setup included sweep, sweep will be turned off.

2-76. INSTRUMENT IDENTIFICATION, SOFTWARE REVISION NUMBER, AND SELF TEST RESULT

2-77. The instrument identification, software revision number, and self-test codes are displayed on the front panel when the operator selects special function 09. The same codes, excluding the software revision number are also displayed after the power-on self test if one or more of the self tests failed. Refer to Section 5E of the 6070A/6071A Operator Manual for theSelf-Test Error Code Interpretation Table.

2-78. INTERROGATE STATUS RESPONSE FORMAT

2-79. In response to an INTERROGATE command, the front panel display field displays either the UNCAL (uncalibrated) condition codes or the REJ ENT (rejected entry) condition codes depending on whether the UNCAL status or the REF ENT annunciator is lit. For a complete description, refer to the Interrogate Operation material in Section 5E of the 6070A/6071A Operator Manual.

2-80. INTERROGATE REJECTED ENTRY STATUS FORMAT

2-81. When the operator makes an illegal entry, the REJ ENT annunciator flashes. For a complete description, refer to the Interrogate Operation paragraph in Section 5E of the 6070A/6071A Operator Manual.

2-82. THEORY OF OPERATION

2-83. Introduction

2-84. The Fluke Models 6070A and 6071A are fully electronically tuned and operated solid-state general-purpose signal generators. They each employ a coaxial cable delay line descriminator for spectral noise suppression and a microprocessor for all local and remote control function as well as for level correction and FM accuracy enhancement. The two generators are identical except for the output amplifier module. The 6070A, which has an upper frequency limit of 520 MHz, uses the A4A7 Output Amplifier. The 6071A, which has an upper frequency limit of 1040 MHz, uses the A4A6 X2 Output Amplifier.

2-85. Physical Layout

2-86. INTRODUCTION

2-87. Physically, the instrument consists of five modules: the front panel, the rear panel, the synthesizer module, the output module, and the delay line module.

2-88. THE FRONT PANEL

2-89. The front section includes the A1A1 Front Panel PCB, the A2A1 Controller PCB, and the optional A2A2 Nonvolatile Memory PCB. The front panel provides the interface between the operator and the signal generator's functional hardware. A 16-bit microprocessor (TMS9900), in conjunction with the software instructions, acts upon the operator commands, whether via the front panel or the IEEE interface, to configure the circuitry and apply corrections. In addition the microprocessor alerts the user of various conditions which may impair the output signal.

2-90. THE REAR PANEL

2-91. The rear panel contains the power supply and the cooling fan. The power supply consists of a high efficiency switching supply followed by series-pass regulators to provide +5V, –12V, +12V, and +24 volts. The switching supply is housed in a shielded enclosure that suppresses radiation and leakage.

2-92. THE SYNTHESIZER AND DELAY LINE MODULES

2-93. The synthesizer and delay line sections provide the frequency generation and angle modulation functions of the instrument. Physically the synthesizer section is the upper swing-out module located in the middle of the instrument. The main phase-locked loop located in this section consists of the A3A5 VCO PCB, the A3A6 SSB Mixer PCB, the A3A4 N/1 Divider PCB, and the A3A1 Phase Detector PCB. The reference signal for the phase detector is supplied by the A3A2 10-MHz Reference PCB. The main loop generates frequencies in the 250-MHz to 520-MHz band with 100 kHz resolution. Additional resolution (1 Hz below 520 MHz to 2 Hz above) is provided by the A3A7 Sub-Synthesizer PCB. The FM noise of the main-loop A3A5 VCO is suppressed by a negative-feedback control system in which the A3A3 Delay Discriminator PCB and the Delay line (A7), function as an FM demodulator. Two other printed circuit boards, the A3A8 Synthesizer Control Buffer and the A3A9 Synthesizer Distribution, provide the digital control interface between the synthesizer module and the controller.

2-94. THE OUTPUT MODULE

2-95. The output section is the lower swing-out module and contains the level control, amplitude modulation, RF bandswitching, audio processing, and the output protection functions. The following printed circuit boards are located in this section: the A4A4 Modulator Divider, the A4A8 Heterodyne Oscillator, the A4A9 Hetrodyne Converter, the optional A4A5 Reverse Power Protector, the A4A2 Modulation Oscillator, the A4A10 Modulation Distribution Assembly, and the A4A7 Output Amplifier for the 6070A or the A4A6 X2 Output Amplifier for the 6071A, and the A4A3 Attenuator.

2-96. Frequency Bands

2-97. The frequency coverage is derived from a fundamental 250-MHz to 520-MHz phase-locked oscillator which is subsequently frequency-divided by two or four, or heterodyned, or in the case of the 6071A, multiplied by two. The fundamental band and the two divided bands each employ two half-octave switched low-pass filters to suppress harmonics. The doubled band uses four switched quarter octave bandpass filters to suppress harmonics and sub-harmonics. The 0.2-MHz to 62.5-MHz heterodyne band is generated by mixing a portion of the fundamental band with a fixed 520-MHz signal from a surface-acoustic-wave (SAW) oscillator. All of the band switching is done automatically, under microprocessor control so it is not apparent to the user. On the fundamental, divided, and hetrodyned bands, seven modulators provide the bandswitching as well as amplitude modulation (AM) and level control.

2-98. Level Control

2-99. A 6 dB per step attenuator (A4A3) and a switched 6 dB gain amplifier maintain coarse control of the output level. Fine control of the output is accomplished by means of a vernier level DAC (A4A10U29) which varies the automatic level control (ALC) loop reference. Control of the step attenuator/amplifier and the vernier DAC is orchestrated automatically by the microprocessor. In addition, the microprocessor applies level correction (a linear function of frequency between calibration frequencies) to compensate for the frequency response of the 6-dB amplifier or the attenuator section(s) in use. This microprocessor correction is applied only to the vernier level DAC; it does not affect the level at which the step attenuator or 6-dB amplifier switches. In other words, all generators will have the same attenuation switched in at a particular programmed level, even though the correction factor is different from synthesizer to synthesizer.

2-100. Frequency Synthesis

2-101. The main phase-locked loop (PLL), which synthesizes the fundamental frequency (250 MHz to 520 MHz band), is a modified divide-by-N loop with a mixer in the feedback path. The reference frequency for the loop is 2 MHz, which would normally provide 2 MHz steps in a conventional divide-by-N loop. However, this instrument uses a modified divide-by-N circuit involving a pulse-deletion function controlled by a rate multiplier to provide 0.1 MHz steps. Additional resolution is gained by a signal from the sub-synthesizer which is introduced into the main loop via the single sideband mixer in the feedback path and provides frequency steps of 1 Hz. The sub-synthesizer loop is similar to the main loop in that it also uses a pulse-deletion function and a single sideband mixer for additional resolution.

2-102. The controller takes into account the frequency dividing, multiplying, or inverting action (on the heterodyne band) of the various bands as well as the offset

introduced by the mixers in the two loops. Also, since the main PLL bandwidth varies with the programmed frequency (due to N changing and variations in the VCO coefficient), the controller programs the phase detector gain in a compensating manner to maintain constant loop bandwidth. By keeping the loop bandwidth constant, loop stability is assured and the modulation transfer response of the loop is controlled so that accurate, high-rate FM is possible.

2-103. Angle Modulation

2-104. Frequency modulation (FM) is implemented by applying the modulation signal simultaneously to the main PLL VCO and Phase Detector, because the main-loop bandwidth is approximately 1 kHz (which is within the modulation frequency range). The loop's response to a modulating signal is frequency modulation with a frequency response like a high-pass filter for signals introduced at the VCO, and phase modulation with a frequency response like a low-pass filter for signals introduced at the phase detector. By pre-processing the modulating signals with an integrator, the phase modulation characteristics for the signal introduced at the phase detector can be made to look like frequency modulation. Then, applying the unprocessed signal to the VCO results in a flat overall FM response. Because the modulation introduced at the phase detector is effectively multiplied by N (where N is the main loop divider ratio) this effect is compensated by scaling the modulating signal. This scaling is done by a multiplying DAC (A4A10U12). Likewise, the modulating signal applied to the VCO is adjusted in amplitude by a multiplying DAC (A4A10U25) to compensate for variations in theVCO tuning. This is done automatically by the controller using measured data which is stored in the calibration EPROM (A2A1U11).

2-105. Phase modulation (ϕM) is similar to FM except the modulating signal is preprocessed in the opposite manner (i.e., the signal applied to the phase detector is unprocessed, and the signal applied to the VCO is differentiated). The integrator or differentiator is enabled automatically by the controller when FM or ϕM is selected. The controller also calculates the FM range and deviation referred to the fundamental band and programs the hardware accordingly. The ϕM is programmed normalized to 10-kHz modulating frequency. This means that ϕM is processed internally just as FM after multiplying the ϕM index by 10 kHz to get the equivalent FM deviation.

2-106. DCFM

2-107. On the 0.2 to 62.5 MHz band, DCFM is generated by frequency modulating directly (and only) the A4A8 Heterodyne Oscillator. When the modulated Heterdyne Oscillator signal at 520 MHz is mixed with the main-loop synthesized signal, the frequency modulation is transferred to the generator's output. On the other bands, the Heterodyne Oscillator is not used directly to generate the output frequency, but instead it is used to provide a DC frequency modulated reference signal to the main loop. However, frequency modulation introduced in this manner only works for modulation frequencies up to the loop bandwidth due to the low-pass nature of the loop. Therefore, the modulating signal is simultaneously applied to the main loop A3A5 VCO to provide an overall flat modulation response.

2-108. DETAILED CIRCUIT ANAYSIS

2-109. Introduction

2-110. The following paragraphs describe, in detail, the more complex circuits in the synthesizers.

2-111. A1A1 Front Panel PCB and A1A2 Encoder Optic PCB Circuit Analysis

2-112. INTRODUCTION

2-113. Refer to the System Block Diagram and the A1A1, A1A2 Front Panel PCB Schematic in the 6070A/6071A Schematic Manual. The A1A1 Front Panel PCB is located in back of the 6070A/6071A front panel. The A1A2 Encoder Optic PCB is part of the Encoder Assembly.

2-114. ENCODER CIRCUIT ANALYSIS

2-115. The knob rotation is sensed by two LED/phototransistor optical switches located on the A1A2 Encoder Optic PCB. The switches are positioned to give a quadrature phase output when the knob is turned. In the rest position DT2 is centered on a tooth of the encoder disc giving a TTL low at TP2 (window), and DT1 is on the edge of a tooth allowing TP1 (trigger) to be high or low. U25 is a quad Schmitt trigger NAND gate; two of the gates are used to provide noise immunity and buffering. Quad NAND gate U22 isconfigured so that either a positive-or negative-going edge provides a pulse with a duration of four gate delays. NAND gate U24-3 combines the edge detector pulses and U24-10 only gates the pulses when TP2 is high. NAND gate U24-11 provides the clock pulses to latch both the direction and interrupt status for the processor. When the knob interrupt is serviced, U21-5 is then preset by the microprocessor.

2-116. The only user adjustment on the A1A2 Encoder Optic PCB is the magnetic detent gap, which is set by positioning the clearance between the pole and teeth to 0.000 inches and then turning the screw clockwise 1/4 turn to 1/2 turn (a gap of 0.002 to 0.003 inches).

2-117. SWEEP OUTPUT

2-118. A microprocessor controlled 0 to 10 volt output is provided that is proportional to the output frequency when sweeping between a start and stop frequency. The digital to analog converter (DAC) is comprised of a current DAC (U34) and an operational amplifier (U33). Resistor R40 is in series with the DAC output to provid short-circuit protection.

2-119. MULTIPLEXED DISPLAYS AND KEYBOARD

2-120. The display is updated approximately every one millisecond for each of the 10 digits and the bright digit is updated for approximately four milliseconds; therefore, a complete display update takes about 14 milliseconds. Flip-flop U20 is used to clear the displays if a new digit is not latched. This protects the displays if the microprocessor should stop refreshing. The same control lines that select the display digits are used to enable the keyboard column selects. The rows are then multiplexed by U23 and read by the microprocessor. Since each column must be stobed, it takes about 14 milliseconds for the keyboard to be read. Potentiometer R30 adjusts the front panel MOD OUT signal from the A4A2 Modulator Oscillator PCB. Switch S1 is the front panel POWER ON/STBY switch.

2-121. A2A1 Controller PCB Circuit Analysis

2-122. INTRODUCTION

2-123. Refer to the System Block Diagram and the A2A1 Controller Schematic located in the 6070A/6071A Schematic Manual.

2-124. MICROPROCESSOR

2-125. A 16-bit microprocessor U22 (TMS9900) is used to control the 6070A and 6071A Synthesized RF Signal Generators. The microprocessor requires ground and threee supply voltages: +5V dc (VCC), +12V dc (VDD), and -12V dc (VBB).

2-126. CLOCK GENERATOR

2-127. The microprocessor U22 requires a four-phase clock which is provided by clock generator U25 (TMS 9904). Capacitor C19 sets the oscillator frequency. C20 and L3 select the third overtone.

2-128. RESET

2-129. The clock generator also has an internal flip-flop which is used for the reset signal. The input originates from comparator U53 and is used to monitor the +5-volt supply referenced against the +12 volt supply. The output of this internal flip-slop is then used as the reset signal to the microprocessor and to U26. This insures that the clock signals are correct before the microprocessor reset signal is removed. A reset signal for the nonvolatile RAM is formed by anding the comparator output and the flip-flop output in CR9 and CR10 so that the reset signal to the RAM is in a defined state when power is switched on and off. When the 5V power supply is at 5 volts, CR7 will be lit.

2-130. INTERRUPTS AND CONTROL/STATUS

2-131. The programmable systems interface U26 (TMS 9901) is used to handle the system interrupt lines and the control and status lines which are used most often. There are three interrupt lines: the IEEE-488 interrupt line, the front panel edit knob interrupt line, and the timer interrupt line (part of U26 used for timing keyboard inputs, display refreshing, and flashing annunciators). The remaining input/output lines used are buffered by U27, U28, and U31 and are decoded on the A1A1 Front Panel PCB, A4A10 Modulation Distribution PCB, and A43A9 Synthesizer Distribution PCB. U34 and U35 form a one-of-eight decoder which performs input/output decoding.

2-132. RAM/EPROM

2-133. The microprocessor needs RAMs (U1 through U4) and EPROMs (U7 through U15). The RAM and EPROM select lines are decoded by a one-of-eight decoder (U16). The RAMs are used as general purpose registers and ordinary read/write memory. The EPROMs (excluding U11) contain the microprocessor instructions and costant data. The Calibration EPROM (U11) contains calibration data which is specific to a synthesizer.

2-134. IEEE-488

2-135. The IEEE-488 compatible bus is controlled through U39 (MC 68488), which interfaces to the microprocessor through synchronizing circuitry. NAND gate U42-6 detects a write condition (DBIN), which enables U43-6 to gate out the microprocessor select signal (MS) from decoder U16 on a read or a write for addresses (AB12 through AB14). This gated chip select signal (MS) is then gated again by U43-3 which is controlled from U42-3. (U42-3 is enabled if U39 had been previously disabled.) When the phase 1 clock goes low (from U46 pin 5 to U42 pin 2), the READY line goes low. The microprocessor then forces WAIT high and allows U39 to be selected. Flip-flop U47-6 and NOR gate U37-6 produce a square wave enable signal at U39 if R/W (U39 pin 5) is low (a write sequence), or a non symmetrical wave if R/W is high (a read sequence).

2-136. Integrated circuit U33 is a tri-state buffer used to read the IEEE-488 bus address switches. Integrated circuit U44 is also a tri-state buffer which is used to switch the data direction on the IEEE-488 bus. Drivers U41, U45, U50, and U51 connect directly to the IEEE-488 bus.

2-137. TEMPERATURE SENSOR

2-138. An over-temperature detector (RT1, U52, and Q1) forces the instrument into a standby condition if the CPU temperature exceeds 65 degrees Celsius (149 degrees Fahrenheit). If this occurs, the fan remains on.

2-139. KERNAL TEST

2-140. The microprocessor and clock generator may be tested by removing U16, U17, U18, and the optional nonvolatile RAM (located on A2A2 PCB) and by setting switch U30-1 to the on (closed) position. This will cause a square wave output on the 15-bit address bus (U22 pins 10 through 24), with the frequency doubling with each address line. The square wave on AB14 will be the lowest

frequency, the square wave AB13 will be double that on AB14, the square wave on AB12 will be double that on AB13 etc., up to AB0 which will be the highest frequency. Most of the IEEE-488 bus synchronizing circuitry may be checked by replacing U16. This will cause a nonsymmetrical output on U22 (pin 10 through pin 24) when the IEEE-488 bus is addressed. Switch U30-2 should normally be in the off (open) position. When switched to the on (closed) position, the self-tests performed on power-on will be skipped. Switches U30-3 and U30-4 should always be in the off (open) position.

2-141. A2A2 Non-volatile Memory PCB Circuit Analysis (Option 570)

2-142. Refer to the System Block Diagram and the A2A2 Nonvolatile Memory PCB schematic located in the 6070A/6071A Schematic Manual.

2-143. The A2A2 Nonvolatile Memory PCB (Option 570) stores up to 50 front panel setups. These setups are retained when the 6070A/6071A is in the standby mode or when the instrument is disconnected from main power. This is accomplished by using CMOS RAMs (U14 to U29) to store the setups and a lithium battery (BAT 1) for backup power when disconnected from the main power. The battery provides more than two years of memory retention with no main power. When switch S1 is open the battery is out of the circuit. When switch S1 is closed the battery is in the circuit.

2-144. There are three sources of power for the RAMs: the battery, the standby supply, and the regulated 5-volt source for the operating mode. A series-pass regulator (Q1, Q2, U30) ensures that the CMOS RAMs operate at the same voltage as the support circuitry. Thus, the regulated +5 volt supply prevents the CMOS RAMs from latching up. Diodes CR1 and CR5 pass current from Q1. The regulator works by CR5 drawing from the same current that the CMOS RAMs draw through CR1. Any change in voltage from comparator U30-7 is applied to the base of Q1. The current is then adjusted through Q1 so that the anode of CR5 is maintained at +5 volts which is the same level as the +5 volt supply to the CMOS RAMs (VCCDR).

2-145. The presence of the nonvolatile memory option is automatically detected by the microprocessor when J2 is plugged into the controller board (A2A1). The signal NVOPL is pulled up to +5 volts when the option is not installed and pulled to ground when J2 is plugged in.

2-146. The RAM chips are decoded by the one-to-eight decoder U5. Eight-bit, single directional bus drivers are used on the low order address bus (U4) and on the data bus (U6 through U9). The data bus drivers are enabled only when the microprocessor memory enable signal (MEMEN) from the microprocessor is low and AB14, AB13, and AB12 are 1, 1, and 0, respectively. The microprocessor signal DBIN is used to determine the direction of the data flow by enabling U6 and U8 for a read from RAM and by enabling U7 and U9 for a write to RAM.

2-147. A3A1 Phase Detector PCB Circuit Analysis

2-148. Refer to the System Block Diagram and the A3A1 Phase Detector Schematic located in the 6070A/6071A Schematic Manual.

2-149. The A3A1 Phase Detector PCB provides the control voltage to the A3A5 VCO or the A3A3 Discriminator stabilized VCO, to keep the loop locked to the appropriate reference with the necessary spur and noise performance. The A3A1 Phase Detector is also involved in processing some of the FM modulation.

2-150. The 10 MHz reference either from a crystal oscillator via the A3A2 10 MHz Reference PCB (J1-PD10M) or from the A4A8 Het Oscillator PCB (J3-VAR10M) is selected by U1 and the VAR10L control line. The ECL signal from the DCFM oscillator is transformed to TTL by circuitry associated with Q1 and Q2. When the DCFM mode and RF frequencies below 62.5 MHz are selected, then VAR10L is asserted (low) turning on Q9 which provides the proper ECL termination conditions with R19 and R53. Transistors Q1 and Q2 switch the current supplied by R15 into ground or into R20. Resistors R16 and R17 provide bias for Q2. The 10 MHz TTL signal from Q2 passes through U1 to a 5:1 divider, U2. When VARI0L is high, the fixed 10-MHz signal is coupled to the divider, Q9 is turned off, and the ECL termination becomes +5V, which turns the signal off.

2-151. The 2 MHz reference signal from the 5:1 divider U2 and the 2 MHz signal from the A3A4 N/1 PCB (J4-2 MHz) are connected to a digital phase-frequence detector (U3 and U4). If the frequency of the signal from the A3A4 N/1 PCB is greater than the reference frequency, there will be positive going pulses at TP5. When TP5 is above ground potential, CR5 is off and CR6 allows the down current from Q6 to flow into the integrator U5. This decreases the voltage at TP6 which lowers the VCO frequency and causes the loop to lock. Test point TP7 is kept positive which allows the up current from R46 to flow out of Q4 instead of the integrator. Similarly, if the N/1 output frequency is below the reference frequency, there wil be negative-going pulses at TP7. When TP7 potential is below ground, CR8 is off and CR7 allows the up current to flow out of the integrator through R46. This increases the voltage at TP6 which raises the VCO frequency. Test point TP5 is kept negative which allows the down current from Q6 to flow into R32 instead of the integrator. Level shifters (Q3, Q4, R22, R23, R24, R32, R33, and R34) center the TTL swing approximately at ground.

2-152. The voltage-to-current converter (Q5, Q6, R42, R44, and U12) supplies the up current by mirroring the current across R45. The voltage at U12-2 is held close to ground so the current produced is proportional to the KVN voltage (P1-13, TP8). The voltage, which is generated by a DAC on the A3A8 Synthesizer Control Buffer PCB, is controlled by the microprocessor. By changing the phase detector current, which changes the pase detector gain (Kϕ in volts/radian), the phase-locked loop bandwidth can be kept constant. A small amount of leak current is pulled out of the integrator by R47 to bias the phase detector at about 2 radians. Under normal operation there should be 2 MHz 200 nS pulses at TP5, and TP7 should be positive. If the loop unlocks there would be pulses at TP7 and, consequently, at C36, C37, R21, R41, and U11. The output of the one-shot produces an error flag (RPDH, P1-12) which is periodically polled by the microprocessor.

2-153. The integrator consists of low-noise operational amplifier U5, C26, R25, and R26. Capacitators C23 and C30 provide some filtering of the 2 MHz reference energy. The output of the operational amplifier is connected, via a test switch SW1, to a multi-pole LC filter (C24, C25, C28, C29, C33, L4, L5, R28, and R31) which attentuates the delete rate (n*100 kHz) and reference (2 MHz) spurs. Diode speed-up networks (CR1, CR2, CR3, CT4, R27, and R29) reduce the source impedance to improve switching speed. Switch SW1 shorts the integrating capacitor C26 and allows the VCO to be tuned by a limited variability dc voltage (from R36, R37, and R38) which puts the output frequency at approximately 375 MHz. The switch is useful for breaking the loop when troubleshooting.

2-154. The FM audio signal (PD FM, P1-11), from the KV DAC on the A3A9 Synthesizer Distribution PCB, is split into two paths on the A3A1 Phase Detector PCB. The path which connects to the integrator U5 is for modulation frequencies inside the phase-locked loop bandwidth. The path which connects to the A3A3 Delay Discriminator PCB (DIFM, P2-1) is for modulation frequencies outside the phase-locked loop bandwidth. The phase-locked loop bandwidth is approximately 800 Hz in the discriminator mode (HI DEV off) and 2 kHz in the high deviation mode (HI DEV on).

2-155. A compensation network (C1, C2, C3, C4, C7, U17, and U18) corrects for the effect of the cleanup loop that follows the signal sideband mixer in the feedback path of the main phase-locked loop. Resistors R1, R2, and R50 provide offset voltage compensation. Resistor network U16 in conjunction with DMOS switches (U14 and U15) are for FM range switching, (Table 2-6).

2-156. Comparators U7 and U8, along with pull-up U10, level shift TTL to the ±12V necessary to operate the DMOS switches. U9 is a 3-to-8 line decoder. Operational amplifier U13 operates as an integrator (to convert ϕ/M to FM) in the FM mode or as an amplifier in the ϕM mode. The audio integrating capacitor C15 is switched by K1. Resistor R11 provides DC stability. A portion of U14 is used to switch in a fixed resistor R9 in the ϕ/M mode. Capacitor C14 provides bandwidth limiting in the ϕ/M mode. The audio signal is AC coupled to the phase detector integrator U5 via C12, C13, Q7, R10, R13 in the FM mode. (Resistor R10 adjusts the low frequency FM gain.) The audio signal is DC coupled to the phase detector via Q8, R12, and R14 in the ϕM mode. Resistor R12 adjusts the low frequency ϕ/M gain. FET's Q7, and Q8 are switched by U7, CR10, and CR11. Resistor R35 is used for offset voltage compensation.

2-157. The high frequency audio is processed by circuitry associated with U20. In the FM mode, U20 is an amplifier whose gain is set by R4 AND R7. Resistor R5 adjusts the high frequency FM/OM balance, and R4 adjusts the overall high frequency gain. In the O/M mode, U20 is a differentiator. The differentiation bandwidth is set by C8 and R3. The two modes are switched by U19 in conjunction with U6 (PHMODL, P1-6). Capacitor C11 provides stability for U20.

2-158. A3A2 10 MHz Reference PCB Circuit Analysis

2-159. BRIEF DESCRIPTION

2-160. Refer to the System Block Diagram and the A3A2 10 MHz Reference PCB schematic located in the 6070A/6071A Schematic Manual for the following Circuit Analysis. Figure 2-1 is a block diagram of the A3A2 10-MHz Reference PCB.

2-161. The A3A2 10-MHz Reference PCB generates the 10 MHz reference signal for the Models 6070A and 6071A RF Synthesized Signal Generators. The 10-MHz signal is generated locally on the pcb in a non-temperature controlled crystal oscillator or off the pcb in an optional 607XA-130 Oven Reference Oscillator. However, an external reference signal can also be used. The selection between internal crystal oscillator and external input is done automatically whenever an external signal is applied. There are two modes of external input operation:

Table 2-6. FM Range Switching

FM RANGE	CONTROL LINE	CONTROL PDRN (2,1,0)H
1 MHz*	7	111
500 kHz*	6	110
200 kHz	5	101
100 kHz	4	100
50 kHz	3	011
20 kHz**	2	010
10 kHz**	1	001

*Used only in the high deviation mode (HI DEV on)
**Used only in discriminator mode (HI DEV off)

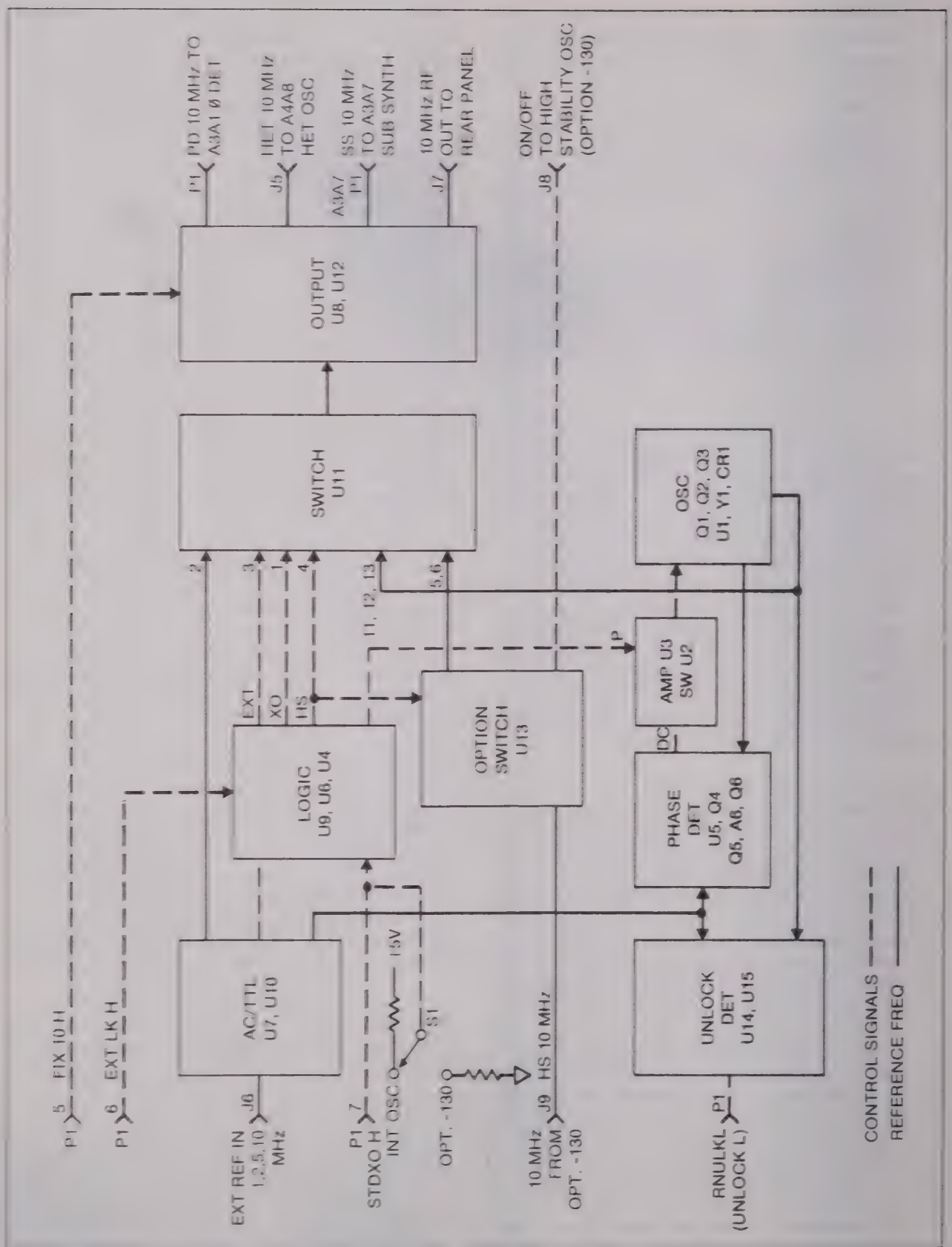


Figure 2-1. A3A2 10 MHz Reference PCB Block Diagram

1. The A3A2 10 MHz Reference PCB crystal oscillator is locked to a 10 MHz reference signal or a subharmonic of 10 MHz (limited lock range). This mode uses the pcb crystal oscillator even with the 607XA-130 Oven Reference Oscillator option.

2. An external 10-MHz reference signal is used directly. This is called the wideband mode.

2-162. The A3A2 10-MHz Reference PCB supplies signals and control for the following:

1. A3A1 Phase Detector PCB (phase detector, main loop, 10 MHz).

2. A4A8 Heterodyne Oscillator PCB (Het Osc 10 MHz).

3. A3A7 Sub-Synthesizer PCB (Sub-Syn 10 MHz).

4. Rear Output Reference (10 MHz).

5. 607XA-130 Oven Reference Option

2-163. The A3A2 10-MHz Reference PCB is made up of the following sections:

1. Crystal Oscillator and Phase Detector Loop

2. AC to TTL Convertor

3. Signal Control Selector Switch

4. Control Logic

5. Output Section

6. Unlock Detector

7. Optional High Stability Reference

2-164. DETAILED DESCRIPTION

2-165. Crystal Oscillator and Phase Detector

2-166. The Crystal Oscillator is a modified Colpitts type. The transistor Q2 and gates U1 are used to buffer and to convert to TTL. The transistor Q1 turns the crystal oscillator off or on. The tuning range of the mechanical capacitor C9 is enough to accomodate initial tolerances and crystal aging rates. The voltage variable capacitor CR1 provides ±100-Hz tuning range for a 2V-to-10V bias range.

2-167. Figure 2-2 is a partial schematic that illustrates the Phase Detector and Amplifier. The MOS switches in U2 are used to switch the voltage control of the crystal oscillator to a fixed bias (resistor divider R9 and R10) in the free-run mode, or to the phase detector in the phase-locked mode. In the phase-locked mode, the reference signal from the external reference input is applied to one flip-flop clock input, U5 pin 3. The signal from the crystal oscillator goes to the other flip-flop clock input, U5 pin 11. The flip-flops are connected so that the width of the pulse, which switches Q5, is the difference in time of these two signals, and the pulse witch turns on Q4 is one period of the crystal oscillator signal. The phase relationship of the stable locked condition is determined by the ratio of these pulse widths. This ratio is determined by values of the resistors R17 and R44 on the "–" and "+" inputs of operational amplifier U3. The average value of each current pulse through each resistor produces an average equal voltage across the resistors so no error voltage exists at the operational amplifier input. The operational amplifier U3 operates as an integrating amplifier with a network of R16 and C15 to produce a low frequency lead break at around 70 Hz. The operating loop bandwidth is about 300 Hz. A constant current source Q6, R18, and R19, and storage-multiplier network C18 and R18 serve to maintain constant phase detector gain and constant loop bandwidth even for inputs that are subharmonics of the crystal oscillator. The pulse rate at the phase-detector output will be the smaller of either the input frequency or 5 MHz. As an example, for a 10-MHz reference input frequency, the phase detector operation holds off every other cycle.

2-168. AC To TTL Convertor

2-169. Figure 2-3 is a partial schematic illustrating the AC to TTL Convertor. The AC to TTL Converter is made up of a standard comparator U7, associated resistors, capacitors, and diodes. The circuit drives a one-shot (U10) which is used as an external signal detector. The input capacitor C20, resistors, and diodes CR3 and Cr4 are used for level conditioning and limiting to protect the comparator. Resistors R24 through R27 set the hysteresis to prevent spurious oscillation. The output of the converter is distributed to the signal control selector switch, phase detector, and unlock detector.

2-170. Signal Control Selector Switch

2-171. The AND OR circuit U11, is used to select one of three inputs for the 10-MHz reference signal source. The three inputs are:

1. A3A2 PCB Crystal Oscillator.

2. 607XA-130 Oven Reference Option (Oven Reference Option Oscillator).

3. External Reference Input (AC TTL Convertor).

2-172. The output of the signal control selector switch U11 goes to the output section. The control is a one-of-three selection and comes from the logic section. The High Stability Ovened Oscillator signal (Option -130 is also controlled by the gates of U13 to provide additional isolation between this signal and the external reference input signal

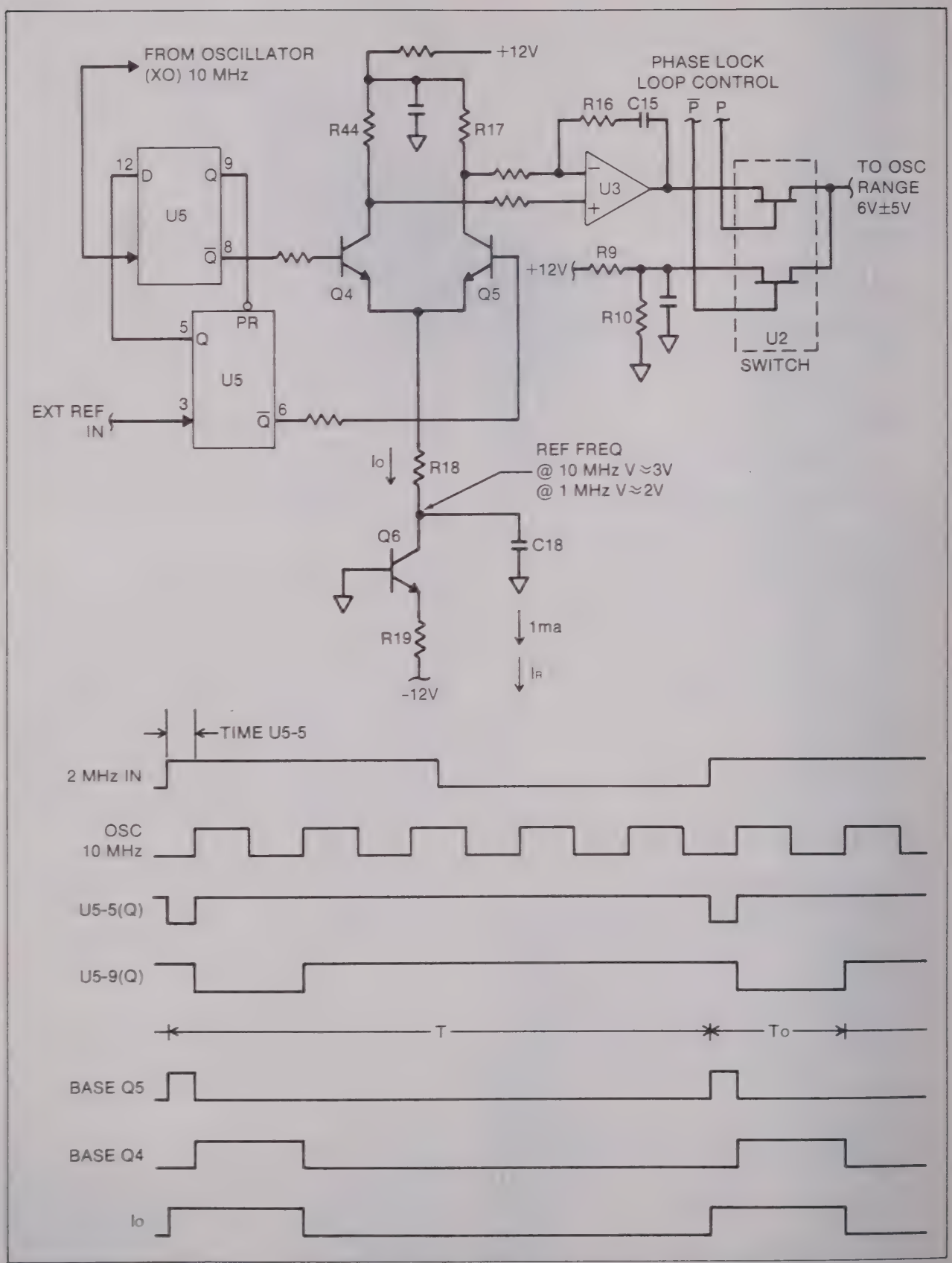


Figure 2-2. Phase Detector and Amplifier

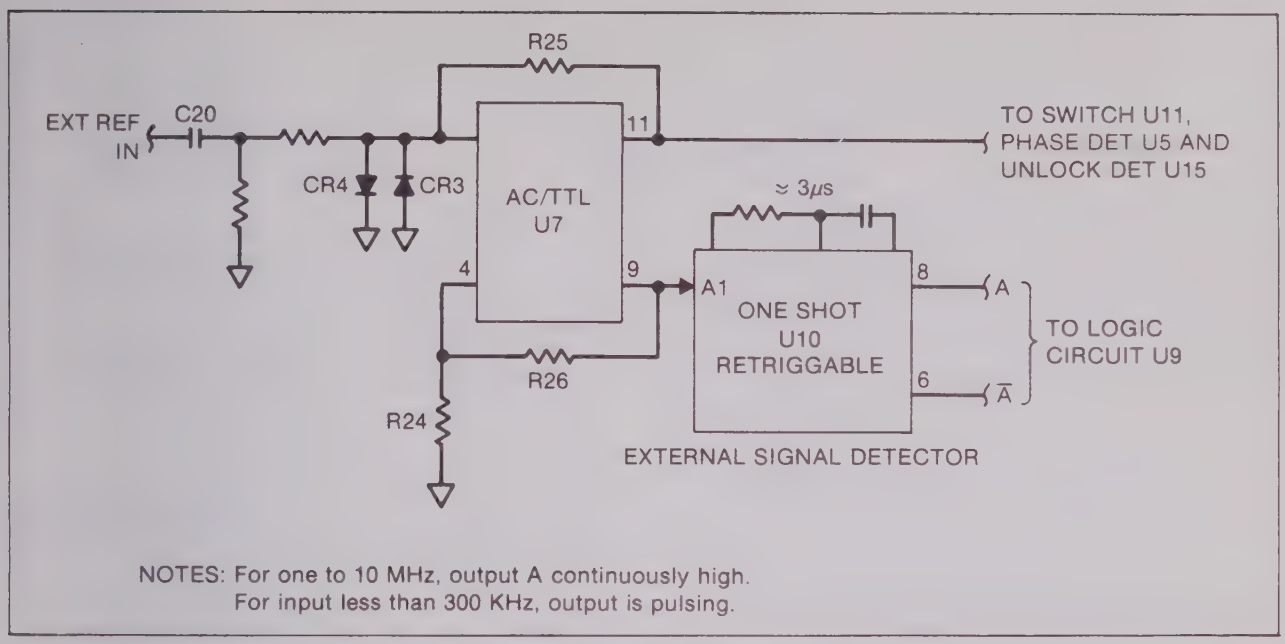


Figure 2-3. AC/TTL Converter

2-173. Control Logic

2-174. The Control Logic Section consists of gates, buffers, and a one-shot (U4, U6, U9, U10, and U13). The three inputs to the logic section are:

1. "A", U10-pins 8 and 6 which is the external signal detector output. The signal detector U10 is a retriggerable one-shot with a pulse width of three microseconds, which makes output u10-8(A) continuously high for signals greater than 1 MHz.

2. EXTLK H (P1 pin 6) which is exercised by the Controller. The signal is set high when the external input is to be phase-locked (shift 60) and set low when the external input is to be wideband (shift 61).

3. STDXO H (P1 pin 7) which is set by switch S1 to a low when the 607XA-130 Oven Reference Option is installed. Since the connector pins go through the plate, S1 can be overridden from either side of the plate. The switch can be used to manually select the crystal oscillator or the Oven Reference Option Oscillator as a signal source.

2-175. This control logic section is combinational logic that produces four outputs:

1. "EXT," U6 pin 4, which controls the external reference (EXT) to the signal control selector switch U11 pin 3.

2. "HS," U6 pin 6, which controls the high stability (HS) input to the signal control selector switch and to gates U13 to control the HS enable line to J8.

3. "XO," U6 pin 10, which controls the XO input of the switch andon/off operation of the PCB crystal Oscillator (XO) through U4 pin 6.

4. "P," U4 pins 2 and 4, which controls the switch U2 in the phase-,ocked loop path (P).

2-176. The control logic relationships are listed in Table 2-7.

2-177. Output Section

2-178. The output section consisting of gates and buffers U8 and U12, has the following four outputs:

1. The PD 10 MHz output connector (A3A2P1) goes to the main loop Phase Detector on the A3A1 Phase Detector PCB. The signal is double buffered in the AND gates (U8-3, U8-6) to provide isolation when the signal is turned off. This 10-MHz signal is controlled with the line FIX 10H (P1 pin 5) determined by the Controller.

2. The Het 10-MHz signal at J5 is double buffered by U8-11 and U8-8 to provide isolation when the signal is programmed off. This signal is controlled from the A4A8 Heterodyne Oscillator PCB on connector J5 and is multiplexed on the signal path along with the AC-coupled ECL level signal. The TTL signal is converted to ECL by resistors, R29, R30, R31, and AC-coupled through capacitor C24. The DC control level is separated from the ECL signal by a low-pass filter (L8, C23) and is applied to the control inputs of U8 pin 9 and U8 pin 13. A low inhibits the ECL signal.

Table 2-7. Control Logic Truth Table

	SIGNAL	STATE
INPUTS	EXT. INPUT SIGNAL	N Y N Y N Y N Y
	WIDEBAND (NOT EXT LKH)*	N N Y Y N N Y Y
	HS OPTION (NOT STDXO H)*	N N N N Y Y Y Y
OUTPUTS	EXT (U6-4)	N N N Y N N N Y
	HS (U6-6)	N N N N Y N Y N
	XO (U6-10)	Y Y Y N N Y N N
	P (U4-2, -4)	N Y N N N Y N N

3. The SS 10-MHz output connector to the A3A7 Sub-synthesizer PCB is P1 (A3A7J1). The Output signal is buffered by U12-4 and U12-6 in parallel.

4. The 10-MHz REF signal output to the rear panel Connector J7 is also buffered by U12-10 and U12-12 in parallel.

2-179. Unlock Detector

2-180. The Unlock Detector is made up of flip-flop U15 and a one-shot U14. The Unlock Detector provides a status output which indicates that the crystal oscillator is not locked to an applied input reference signal. The flip-flop input (U15 pin 3) is clocked by the external reference output from the AC TTL circuit, and the signal at the D (U15 pin 2) input comes from the crystal oscillator. As long as the two signals are not shifting in phase, the output of the flip-flop will not change. However, if the phase between the two signals is changing, then the output of the flip-flop will be changing at a rate equal to the frequency difference between the two signals, which is in general greater than 100 Hz (the pull range of the crystal oscillator). This output, applied to the one-shot U14, triggers the one-shot on a positive transition. The one-shot is retriggerable and has an output pulse width of about 0.2 seconds. So, it operates as a pulse stretcher providing the microprocessor status information available as RNULK L at connector P1 pin 4. Thus, a negative output on this line indicates that the crystal oscillator (6070A/6071A system reference) is not locked to a externally applied reference and that the two frequencies are not within atolerance range of each other, or that some other fault exists. R45 and C30, (the crystal oscillator input to the flip-flop U15 pin 2) shifts the transition point in this signal away from the clock transition point to avoid false indications on the status line.

2-181. A3A3 Delay Discriminator PCB Circuit Analysis

2-182. Refer to the System Block diagram and the A3A3 Delay Discriminator PCB located in the 6070A/6071A Schematic Manual.

2-183. The A3A3 Delay Discriminator PCB, in conjunction with the Delay Cable Assembly, provides phase noise suppression of the 250-MHz to 520-MHz signal supplied by the A3A5 VCO PCB. The delay discriminator circuit is tuned to the selected A3A5 VCO operating frequency by logic signals from the microprocessor. Phase noise suppression of approximately 20 dB is achieved by the delay discriminator. The A3A3 Delay Discriminator also incorporates FM modulation circuits including a range attenuator and mode selection which disables the delay discriminator circuit and allows the A3A5 VCO to be directly frequency modulated, thus providing greater FM deviation capability.

2-184. The VCO signal enters the A3A3 Delay Discriminator PCB via A3A5J1 at a level of +6 dBm and an impedance of 50 ohms. This signal is amplified 10 dB by U1 and split into two separate signals at the output of U1 by hybrid W1. One signal is attenuated 4 dB by R10, R11, and R12 and is routed to A4A4 Modulator/Divider (A4A4J13). This signal becomes the main output of the Synthesizer Section. The other signal is amplitude-limited by CR1 and CR2, amplified 10 dB by U2, and attenuated by CR3 and CR4. This attenuator is electrically adjustable via U5 and is part of a leveling loop including (T1, T2, T3, CR14, U5, and CR3 and CR4). This loop holds the signal from U6 pin 1 constant in amplitude at CR4. The amplitude-controlled signal is then low-pass filtered (via L15, L16, L17, and C15 through C20) and is amplified 10 dB by U3 and 6 dB by U23 to a level of approximately +22 dBm at U23 pin 3.

2-185. The high power signal from U23 pin 3 is applied via E7 to quadrature coupler W2 which splits the power between terminals E8 and E9. The signal at E9 is phase shifted –90 degrees compared to the signal at E8 (0-degree phase). The PI signal can be either a high or low logic signal and is applied to the A3A3 PCB at P1 pin 2. Diodes CR24 through CR27 act as a reversing switch controlled by the PI logic signal to cause the 90 degree shifted signal to appear at the DELAY OUT jack (A3A3J11) and the 0-degree phase signal to appear at C21 or the 0-degree signal

the appear at A3A3J11 and the 90 degrees signal to appear at C21, depending on the logic state of PI. The net effect of this action is to cause the relative phase between C21 and A3A3J11 to switch 180 degrees in response to a change in the logic level of PI. The level at A3A3J11 and C21 is approximately +18 dBm.

2-186. Quadrature coupler W3 acts in a similar manner to W2, causing the signal at E12 to be split between E13 and E14. The signal is phase shifted -90 degrees at E14 compared to the zero degree phase shift at E13. Diodes CR18 through CR21 act to select either the 90 degree signal or 0-degree signal in response to a logic level from PI2. This signal is greater than +11 dBm and is applied to phase detector U6 pin 4.

2-187. The signal at A3A3J11 passes through the A7 Delay Cable Line. The delay cable delays the signal 230 nsec and attenuates the signal 6 dB to 9 dB, depending on frequency, and returns the signal to the A3A3 Discriminator PCB via A3A3J12.

2-188. Diodes CR6 through CR11 and inductors L9 through L14 form a three-section tunable bandpass filter which acts as a ±180-degree electrically tunable phase shifter when operating near the center of its pass band. The phase-shifted output passes through transformers T1 and T2 which act as a directional coupler to tap off 10 percent of the power. This power is applied to the leveling loop via detector CR14 and CR15, which maintains the level of phase detector U6 pin 1 constant at +5 dBm. Potentiometer R24 sets this level. Potentiometers R48 and R50 adjust the shape factor of the tunable bandpass filter to best optimize the response over the frequency range.

2-189. The phase shifter (tunable bandpass filter) is incorporated in a feedback loop designed to hold the output of phase detector U6 to precisely 90 degrees (zero volts out). This loop functions as follows. The voltage from U6 pin 2 (zero volts) is routed to voltage comparator U14 pin 3, and the error voltage is amplified by U12. Potentiometer R86 is used to trim the offset voltage which sets the voltage out of U6 pin 2 (TP5) to precisely zero volts. The error voltage from U12 is applied to operational amplifier U4 which amplifies the error voltage to cause the electrically tuned phase shifter to be adjusted in phase until the output of U6 pin 2 returns to 90 degrees (zero volts out). The Phase Shifter DAC voltage (PHV) is a tracking voltage which adjusts the tuning voltage to the bandpass filter/phase shifter via U4 to keep the filter operating in the center of its bandpass regardless of operating frequency. The PH voltage is generated from data stored in the calibration EPROM (A2A1U11) via a DAC located on the A3A8 Synthesizer Control Buffer PCB. Potentiometer R45 adjusts the PH voltage. Operational amplifier U10 and diodes CR22 and CR23 form a symmetrical clamp that prevents the error voltage from exceeding a level that might cause the phase shifter to be adjusted out of its bandpass range. The clamp voltage is adjusted as a function of frequency by applying the PH voltage to U10 which controls the diode conduction point.

2-190. The circuits described act together to form a delay discriminator that tracks the incoming VCO frequency. The output of the discriminator at TP5 is amplified by a descrete operational amplifier having very low noise (Q6, Q1, Q2, and Q3). The signal is applied to J1 pin 6 (output to VCO) via switches/attenuators Q4 and Q9. This feedback loop causes the noise of the VCO to be improved by approximately 20 dB.

2-191. In order to eliminate potential hangup modes, an acquisition/lock-on circuit is incorporated. The zero voltage signal from the delay discriminator output (U6-2) is amplified by U14 and compared to a reference voltage set by R81 and R82 to insure that anytime this voltage exceeds ±1 volt the comparator U16 will fire U13 (an 8-msec one-shot).

2-192. Firing one-shot U13 causes Q4 to open and Q9 to close, disconnecting the delay discriminator from the circuit. Firing the one-shot U13 also turns on Q5, which establishes the correct lead-lag network for the main phase lockloop operating with the discriminator loop disconnected.

2-193. Potentiometer R146 adjusts the relative voltage to Q4 and Q5 so that the transition between the two modes is smooth and controlled. When one-shot U13 fires, the edge of the pulse is differentiated by C87 and C88 causing the clamp (U10, CR22, and CR23) to close momentarily. This closure puts the phase shifter momentarily in the center of its tuning range, thereby establishing a standard starting point for the acquisition of the discriminator loop. The acquisition process is initiated by a change in the PI or PI2 signals which are sensed by the comparators (U16-1 and U16-2). Acquisition is complete when the 8-msec time-out is completed and the output of U6 is within the acceptable band (around zero volts).

2-194. The turn-on self-check routine monitors DDINV while the frequency is changed to verify that it pulsed during the acquisition cycle and then remains low. If DDINV continues to pulse, this is an indication of a fault and is annunciated as self-test error code 040 in the AMPLITUDE display or as a frequency UNCAL error code of 020.

2-195. Switches U18, K2, and K3 are used in conjunction with scaling resistors U17 to attenuated the audio modulation signal DIFM coming from the phase detector A3A1P2. Logic signals DIRN(0-2)H and DIMOD(H) control the attenuator ranges via drive U20.

The output of the range attenuator is applied to the negative input of the discrete operational amplifier (Q6, Q1, Q2, Q3) causing the delay line descriminator stablized oscillator to be FM modulated by the audio modulation signal. A small portion of the range attenuated audio modulation signal is further attenuated by R67 or R53 and applied to the negative terminal of U14. This signal is used to eliminate modulation signals in the phase zeroing loop (U14, U12, and U4).

2-196. Relay K1 sets the instrument in the high deviation mode via the VCO(H) logic signal which is used to disable the delay discriminator by removing 12 volts from the RF amplifiers U2 and U3 via switch Q10 and Q11. In this mode, the FM modulation audio signal is applied directly to the VCO modulation terminal via the same audio range switch U18, decoder U21 and U20, and relays K3 and K2. Relay K4 disconnects R93 reducing the noise gain of the operational amplifier (Q6, Q1, Q2, and Q3). In the high deviation mode, the amplifier gain is adjusted to provide 10 times greater modulation for each range step than is provided in the normal mode. Potentiometer R103 adjusts the FM deviation level in the high FM deviation mode at 10 kHz rate. Potentiometer R110 adjusts the high deviation mode main loop bandwidth to 2 kHz.

2-197. The function of Q7 is to increase operational amplifier (Q6, Q1, Q2, and Q3) loop gain at frequencies greater than 380 MHz when in the normal mode, offsetting a decrease in VCO modulation sensitivity.

2-198. A3A4 N/1 Divider PCB Circuit Analysis

2-199. BRIEF DESCRIPTION

2-200. Refer to the System Block Diagram and the A3A4 N/1 Divider Schematic located in the 6070A/6071A Schematic Manual.

2-201. The programmable A3A4 N/1 Divider PCB is part of the main (250 MHz to 520 MHz) synthesizer loop and provides control of the 0.1, 1, 10, and 100 MHz digits. The divider input is the output of the A3A6 SSB Mixer and the output, which scales the input of the programmed division to 2 MHz, goes to the A3A1 Phase Detector, N/1 input. The reference frequency for the A3A1 Phase Detector is 2 MHz.

2-202. The N/1 Divider has two major sections (refer to Figure 2-4):

1. Divider
   a. Dual Modulus, 10/11 Prescalar
   b. Counter
   c. Rate Multiplier
2. Digital
   a. Latches (Two Levels)
   b. Load Circuit

2-203. The Divider uses the dual modulus prescaler with a two section counter and the rate multiplier to divide the input to 2 MHz in a ratio with a fractional increment of 0.05. The ratio ranges from 124.85 to 259.85 in the normal operating range of 250 MHz to 520 MHz in 100 kHz steps. The offset in the divider ratio relates to the SSB Mixer offset. The divider counting cycle is controlled by the counter logic.

2-204. The programmed division is set by the latches. The latches accept signal input from the controller and program the counters in parallel on command from the load circuit. The Load Circuit is under control of the microprocessor controller and is synchronized to the divider output.

2-205. DETAILED CIRCUIT ANALYSIS

2-206. Divider

2-207. The 250 MHz to 520 MHz signal is divided down in 2 MHz in 100 kHz steps by programming a ratio of 124.85 to 259.85 in 0.05 fractional increments. The main components of the divider are: dual modulus 10/11 prescalar U13, two counter sections (U14, U15, and U16), a rate multiplier fractional counter (U4, U5, U7, and U8), and counter logic (U17).

2-208. The fast (600 MHz) dual modulus prescaler U13 is used in conjunction with slow (100 MHz) programmable counters to produce a fast-programmable (570 MHz) divider.

2-209. The input signal to the dual modulus prescaler U13 is conditioned to a proper level by limiting diodes CR1 and CR2 and associated resistors R1 through R6. The prescaler U13 simply scales the input signal by a ratio of 10 or 11 depending on the mode control line. A high on U13 pin 13 forces aprescaler ratio of 10. A low on U13 pin 13 forces a prescaler ratio of 11. There are two types of outputs: an ECL output and a TTL output. The ECL output is fed to the counters and the counter logic, and the TTL output is fed to a TTL D-type flip-flop U20.

2-210. The dual modulus prescaler U13 is imbedded in a two counter system which has a units counter U14 and a tens and hundreds counter, U15 and U16 (also called "A" and "N" counters). The "A" counter counts only the prescaler cycles of count by 11. Therefore, the total count, N(c), of the counter part of the divider is:

$$N(c) = (N-A)*10 + A*11$$
$$= N*10 + A*1$$

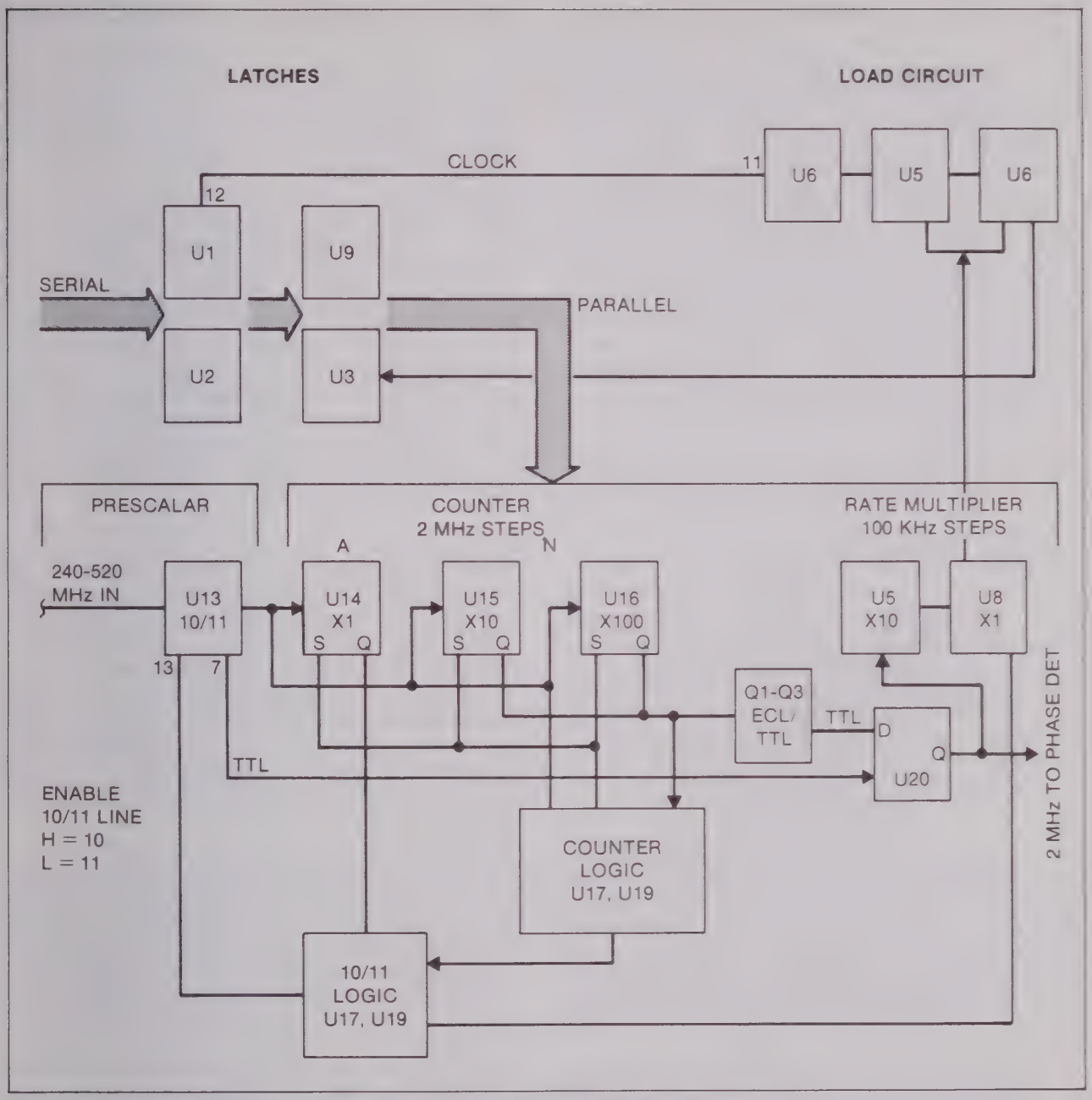


Figure 2-4. A3A4 N/1 Divider PCB Block Diagram

2-211. The counter logic determines when the counters halt and when they load the programmed number. The dual flip-flop U17 and gates in U19 are used to anticipate (early detect) the end count and load the programmed number at the proper time to the counters U14, U15, and U16, through the "S" lines (count up, down/load/hold) and "CE" (enable) lines. Flip-flop U17 and AND gate U19-2 are used as well to logically sum the inputs (from U14 "A" counter and the Rate Multiplier) to the 10/11 mode line for an "11" count of prescaler U13. Flip-flop U17 is necessary to accommodate race conditions, ambiguous states, and delay of the outputs from the counters. It is clocked by the prescaler U13 output and synchronized to counters.

2-212. The ECL/TTL converter (which consists of U19, transistors Q1, Q2, and Q3, diode CR3, associated resistors, and one clocked D-type flip-flopU20) is used to generate a TTL output that is not ambiguous. The TTL output from the dual-modulus prescaler U13 clocks the information from the counters U14, U15, and U16 on the "D" input U20-2. The "Q" output U20-5 becomes the output of the N/1 Divider PCB at connector J13 and is also present at test point TP5.

2-213. Figure 2-5 is a partial schematic of the rate multiplier. The rate multiplier produces the fractional part of the division. The rate multiplier is made up of a flip-flop U5, some gates of U4, inverter U7, and a decade rate multiplier, U8. This combination produces a single bit tens decade and a BCD units decade, U8, for the fractional part. The rate multiplier follows the ECL/TTL converter and produces a pulse train which has a programmed number N(r) of pulses for a frame of 20 cycles of the output of the PCB. The programmed number ranges between 0 and 19. The rate multiplier output, available at test point TP2, is translated to ECL level by resistors, R11, R12, and R13, and combined in the mode line of the prescaler through gates of U19. Thus, the prescaler counts by 11 for every rate multiplier output pulse and the fractional part, N(f), of the overall division ratio becomes $N(f) = N(r)/20$.

2-214. Notice that the pulses are not necessarily equally spaced in time. This produces jitter on the N/1 Divider output at a possible lowest rate of 100 kHz. This spurious product is filtered out by the transfer characteristics of main loop response and the phase detector low-pass filter.

2-215. The total division ratio is found by combining the counter division, N(c), and rate multiplier division, N(f). This total division ratio becomes:

$$N(\text{total}) = N(c) + N(f) = 10\,N + A\,N(r)/20.$$

2-216. The frequency (fin) of the input for 2 MHz output is:

$$\text{fin} = 20N + 2A + N(r)/10 \text{ MHz}$$

2-217. The numbers programmed to the divider are not the division ratio; they do not correspond directly to the front panel display either. The schematic shows these numbers, N, A, N(r), with respect to programmed frequencies in the fundamental band, a 2 MHz (reference) frequency, and the offset frequency introduced in the SSB Mixer. The program number for the divider can be found by:

1. Referring the output frequency to the fundamental band (250 MHz to 520 MHz).

2. Subtracting the 201 kHz offset introduced in the SSB Mixer.

3. Partitioning the number into two parts between the 10-kHz and 100-kHz digit. Lower order digits are for the Sub-Synthesizer.

4. Using the 100-(BCD) kHz and 1-MHz (single bit only) digits directly.

5. Scaling the remaining 2-MHz and greater digits to a 2-MHz reference, by dividing by 2.

2-218. The program number, as shown on the schematic, consists of three BCD digits times 2 MHz reference (X1, X10, and X100 BCD) digits, a single bit digit times 1 MHz (X1, or 100 kHz X10 single bit), and a one BCD digit times 100 kHz (X1 BCD). The counter and the rate-multiplier receive this input programmed number from the latches.

2-219. Digital Latches and Load Circuit

2-220. The latches, (U1, U2, U3, and U9) which control the divider are arranged into two levels (ranks). The first level U1, and U2, is loaded directly by the Controller via the serial interface bus. The serial data DNTAH is distributed into the latches by the address, NAB(0-2)H, and select, NSEL(0-2) > lines (P1 pins 1-7). The most significant bit of the first level latch is used for initiating the action of the load circuit to transfer of the information from the first level latches to the second level latches in parallel into the counter and rate multiplier program inputs.

2-221. The load circuit is intiated by a positive transition of this bit (from U1-12) as determined by the controller (refer to Figure 2-6). (This bit is also inverted by U10-13 to the connector, P1 pin 8, as a test bit, N1TST H.) The load circuit is further synchronized with the divider output with the frame rate of the rate multiplier. The trailing edge of the 10-microsecond, negative-going pulse from the load circuit clocks the new frequency data into the second level latches. A positive version, available at TP1, is sent to the PCB output connector, P1 pin 14, (as TMCNT H) and is used to update the Sub-Synthesizer frequency on the leading edge.

2-222. The two level latches (serial to parallel), the 10-microseconds delay time in the signal (TMCNT H), (a match to synthesis path delay), and the synchronization of the edges simultaneously update the frequency control to the dividers in both the main loop and the sub-synthesizer loop to minimize phase discontinuities in the generator output during frequency switching.

2-223. To prevent a hangup if the divider is programmed to zero, U10 is connected between the latches and counter program input in the most significant digit. If a zero is present on the inputs of U10, the output will be a one. (Both one and two input values are valid.)

2-224. A3A5, A3A10 VCO Resonator PCB Circuit Analysis

2-225. Refer to the System Block Diagram and the A3A5, A3A10 VCO Resonator PCB Schematic in the 6070A/6071A Schematic Manual. The A3A5 VCO Resonator VCO PCB and the A3A10 VCO Resonator PCB are identical; consequently, the same schematic applies to both PCBs. The A3A5 PCB is located on top of the Synthesizer Module, and the A3A10 is located on the bottom of the Synthesizer Module.

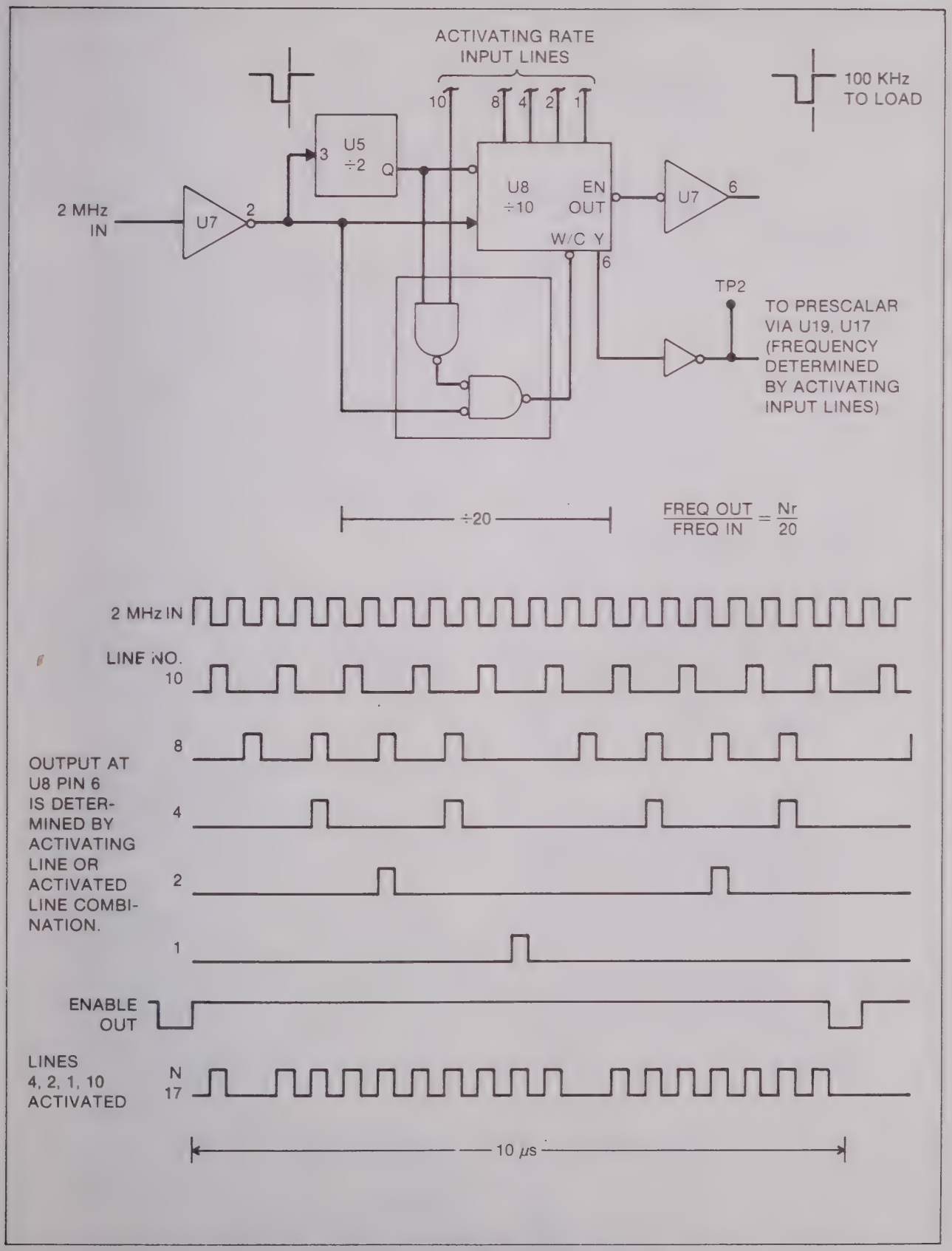


Figure 2-5. Partial Schematic of Rate Multiplier

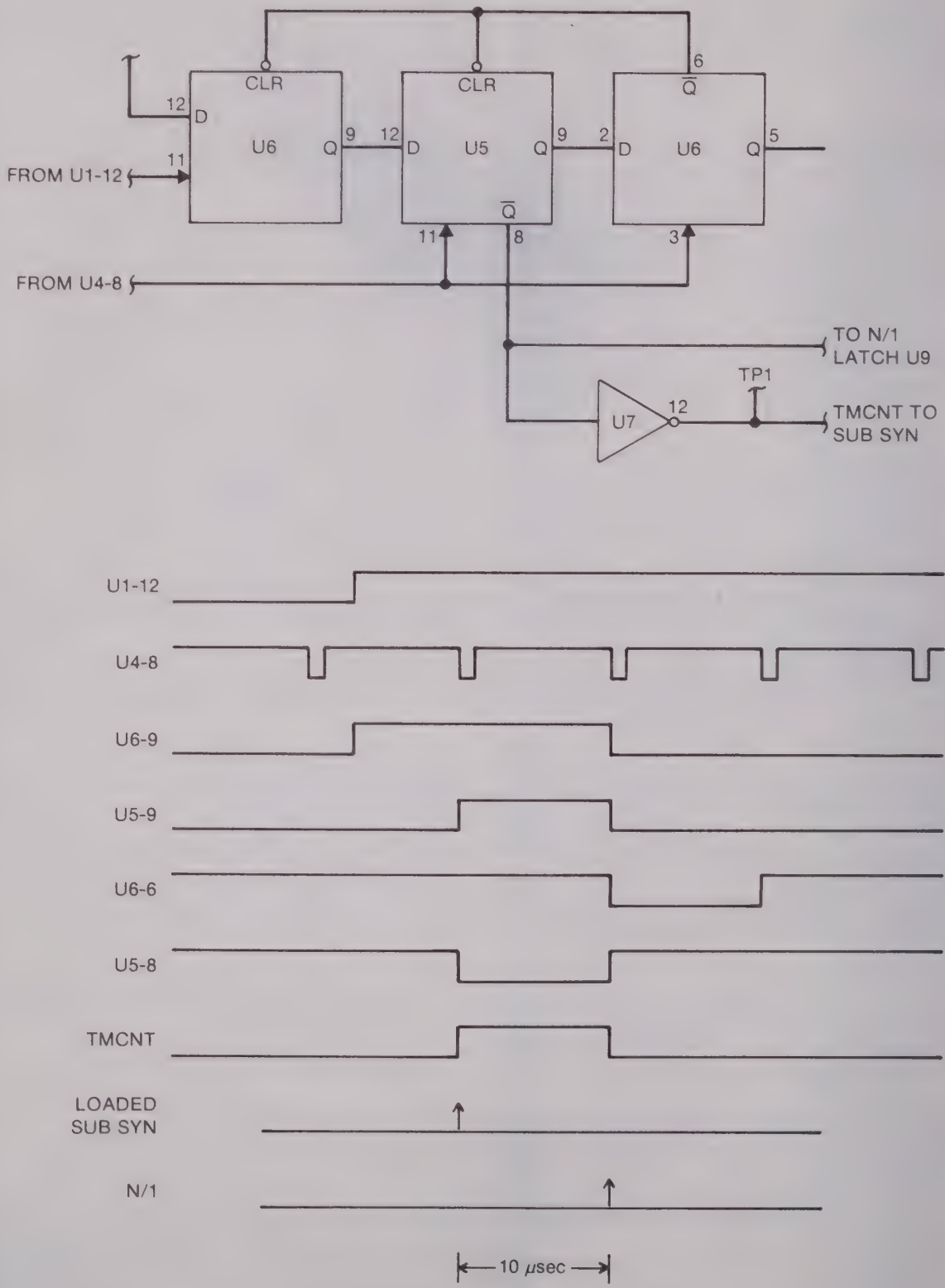


Figure 2-6. Frequency Load Cycle

2-226. Each VCO Resonator PCB is a relatively low noise, voltage-controlled oscillator capable of being electrically tuned over a minimum frequency range of 250 MHz to 520 MHz. The A3A5 PCB and the A3A10 PCB make up a matched pair (frequency tracking) of VCOs. The A3A5 VCO Resonator PCB is used as the main loop VCO, and the A3A20 Resonator VCO PCB is used as the cleanup loop VCO. The following circuit analysis applies to both PCBs.

2-227. The oscillator consists of a transistor which is physically located on U1 and a resonator (CR1, CR2, and L5 through L8). Inductors L5 through L8 are sections of stripline transmission line. Diodes CR1 and CR2 are voltage-controlled variable capacitance diodes. The main frequency control voltage for phase-locking is applied to the cathodes of CR1 and CR2 through E1, whereas the wideband FM modulation signal is applied to the anodes of CR1 and CR2 through E5. The tuning coefficient varies with frequency and is roughly 20 MHz per volt at 250 MHz increasing to about 30 MHz per volt at around 320 MHz, and then decreasing to about 10 MHz per volt at 520 MHz.

2-228. The buffer U2 consists of several amplifier sections used to isolate the two output paths from each other and from the oscillator circuit. This minimizes pulling of the oscillator by external circuit effects and prevents signals present at one output port from affecting the other output port.

2-229. A3A6 Single Sideband Mixer (SSB Mixer) PCB Circuit Analysis

2-230. Refer to the System Block Diagram and the A3A6 Single Sideband Mixer PCB Schematic located in the 6070A/6071A Schematic Manual.

2-231. The A3A6 Single Sideband Mixer (SSB Mixer) operates in the main synthesizer loop in conjunction with the programmable A3A4 N/1 Divider, the A3A1 Phase Detector, and the A3A10 VCO to synthesize the fundamental frequency range from 250 MHz to 520 MHz. The SSB Mixer adds in a 200-kHz to 300-kHz signal from the sub-synthesizer to provide lower order (1 Hz to 10 kHz) digits of resolution.

2-232. The SSB circuits consists of a lower sideband mixer followed by a phase-locked loop (PLL) functioning as a tracking filter (also referred to as a clean-up loop). The lower sideband mixer uses quadrature mixing techniques. The tracking filter employs a VCO, a Frequency-Phase detector, frequency scalers (dividers), loop amplifiers, and control circuits.

2-233. The tracking filter reduces the unwanted signals in the output of the LSB mixer to prevent intermodulation spurious generation in the main loop. The tracking PLL bandwidth is controlled because of its influence on the main loop angle modulation characteristics.

2-234. SSB MIXER THEORY

2-235. The single sideband mixer consists of two phase shifters and two mixers. The low frequency in the 200-kHz to 300-kHz range is subtracted from the high frequency in the 250-MHz to 520-MHz range. Figure 2-7 is a simplified schematic of the A3A6 Single Sideband Mixer.

2-236. The low frequency is generated and split into two signals in a 90-degree phase relationship in U16 and associated low-pass filters. The input signal frequency at J1 is actually four times the mixer input signal frequency. This input signal frequency is in the 800 kHz to 1200 kHz range and drives a divide by four U16 which is connected as a two-bit ring counter and produces two square waves in quadrature (90 degree phase relationship). This is illustrated in Figure 2-8. The one signal from U16 pin 5 is fed through low-pass filter (C41, L19, C43, C42, L10, C44, and L11). The resistors, R60, R61, R62, and R63 scale the signal to the proper input level (about –2 dBm) for the mixer U12. This signal is at a relative 0 degrees. The other output of U16 from pin 8 goes through the low-pass filter (C45, L12, C47, C46, L13, C48, and L14) and is scaled by resistors R64, R65, R66, and R67 to a proper level for mixer U11. This signal is at a relative phase angle, –90 degrees.

2-237. The high frequency inputs to the mixers are generated from the input at J2. The frequency is buffered by amplifier U7 and attenuated by the resistor pad, R71, R70, and R72, to provide reverse isolation for the input at J2. Amplifier U13 provides some limiting and power gain to drive the 3 dB quadrature hybrid W1. This device produces a 90-degree phase shift between two equal amplitude signals. The one output of W1 drives the L0 port of mixer U12 at +7 dBm level at 0 degrees relative phase, and the other output of W1 drives the L0 port of mixer U11 and +7 dBm at –90 degrees relative phase. The isolated port of W1 is terminated in a resistor R59.

2-238. Because of the phase relationship of the outputs of the two double-sideband, suppressed-carrier mixers, the summing of the two composite signals (in resistor network, R68 and R69) results in the upper sideband component being suppressed. Therefore, the only large signal is the lower sideband signal which is larger than the others by about 25 dB. This signal is amplified by U6 to drive the divider U5.

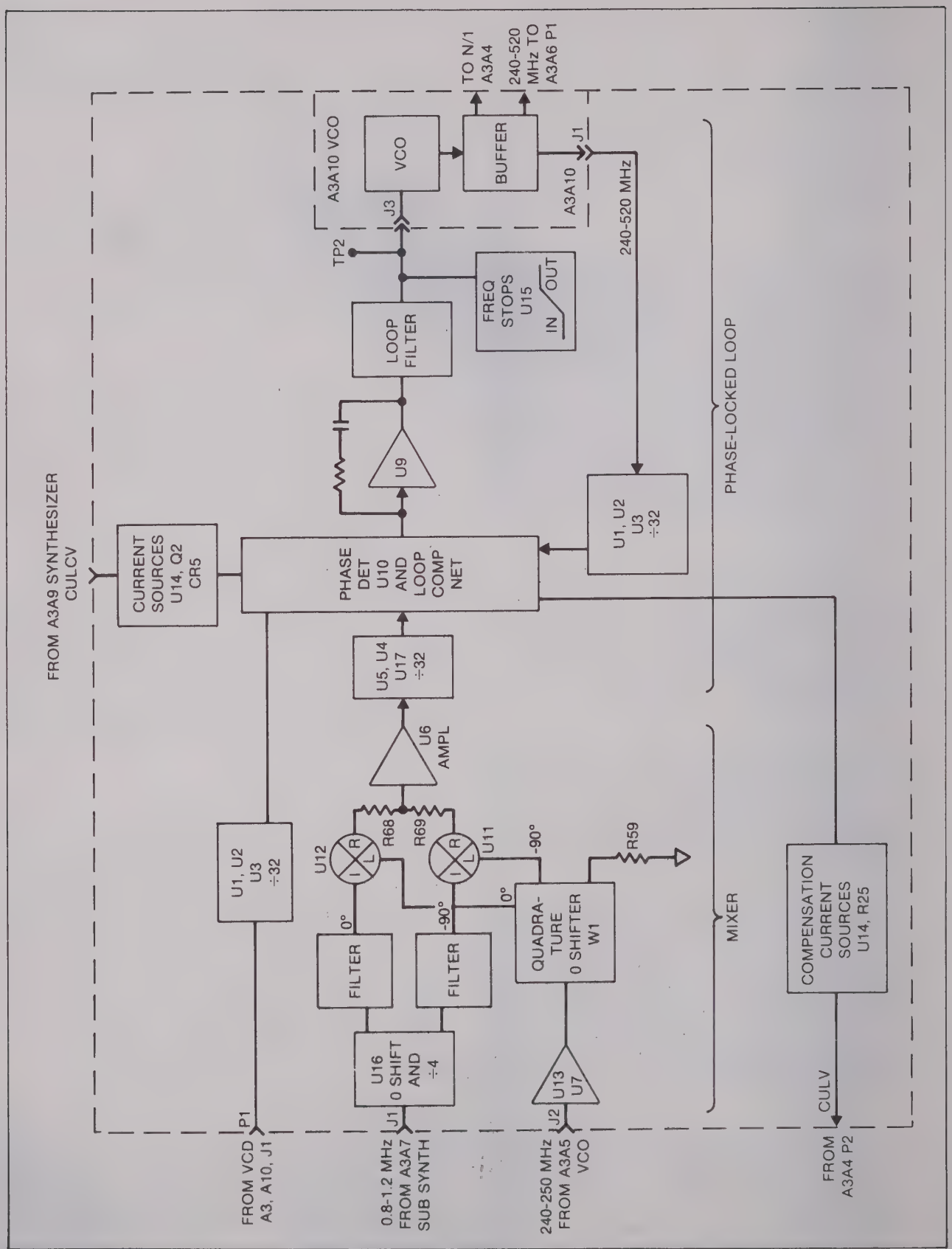


Figure 2-7. A3A6 Single Sideband Mixer, Simplified Schematic

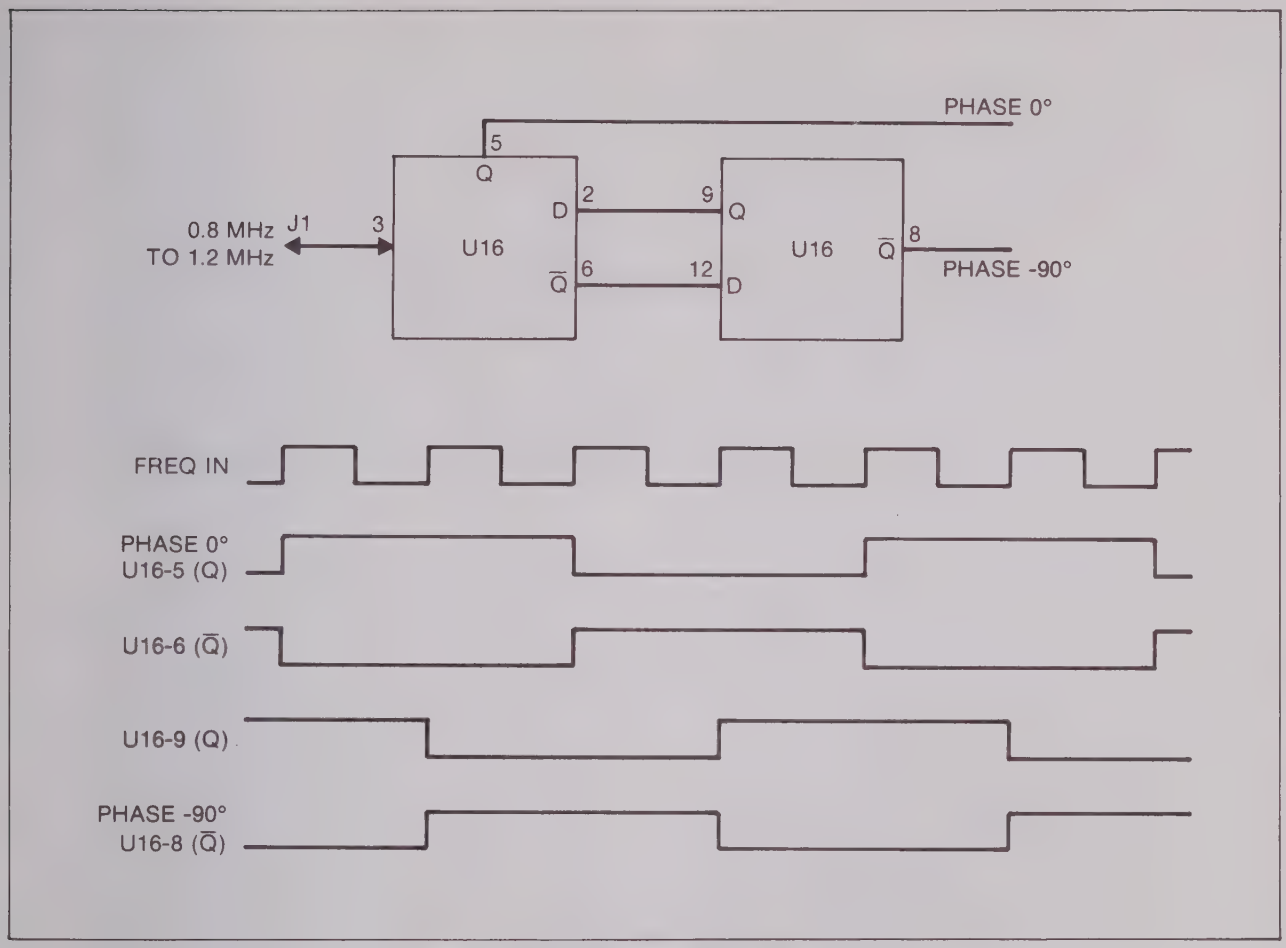


Figure 2-8. Low Frequency Phase Shift, U16

2-239. PHASE-LOCKED LOOP (CLEANUP LOOP)

2-240. The cleanup loop, a phase-locked loop (PLL) tracking filter, follows the mixer circuits and performs a cleanup function by reducing the unwanted signals and by suppressing the generation of spurious signals in the main loop divider. The cleanup loop consists of a voltage controlled oscillator (VCO), frequency scalers, a frequency/phase detector (with the loop compensation network), a loop amplifier, a loop filter, and frequency stops for the VCO.

2-241. The frequency/voltage characteristics of the VCO (A3A10) matches that of the main loop VCO (A3A5). This is necessary since common information for loop gain compensation is used for both loops.

2-242. Two divide-by-32 frequency scalers are used in the cleanup loop. The SSB Mixer drives one scaler (divider chain). This divider chain has a divide-by-four prescaler U5 followed by a dual flip-flop U4 connected as a divide-by-four and followed by one flip-flop (1/2 of U17) connected as a divide-by-two. The VCO drives the other divider chain consisting of U1, U2,and U3.

2-243. The two divider chains drive the frequency/phase detector which consists of detector U10, switching diodes, CR1 through CR4, and the switched current sources embodied in U14. Figure 2-9 is a simplified schematic of this frequency/phase detector circuit. The mixer divider drives the R (reference) input of the frequency/phase detector and the VCO divider drives the V (variable) input of the frequency/phase detector. If the V input is low in frequency or lagging in phase, the U (up) output acts with diodes CR3 and CR4 to cause the negative current source to slew up the voltage output of the integrating operational amplifier U9. This (through the loop filter network) forces the VCO up in frequency. (The VCO has a positive frequency-voltage transfer.) Similarly, if the V input is high or leading, the D (down) output works in conjunction with diodes CR1 and CR2 to cause the positive current source to steer the VCO down in frequency. The loop dynamics allow the circuit to settle to a steady state, in which the D output pulse width is just wide enough to account for the offset current through resistor R53.

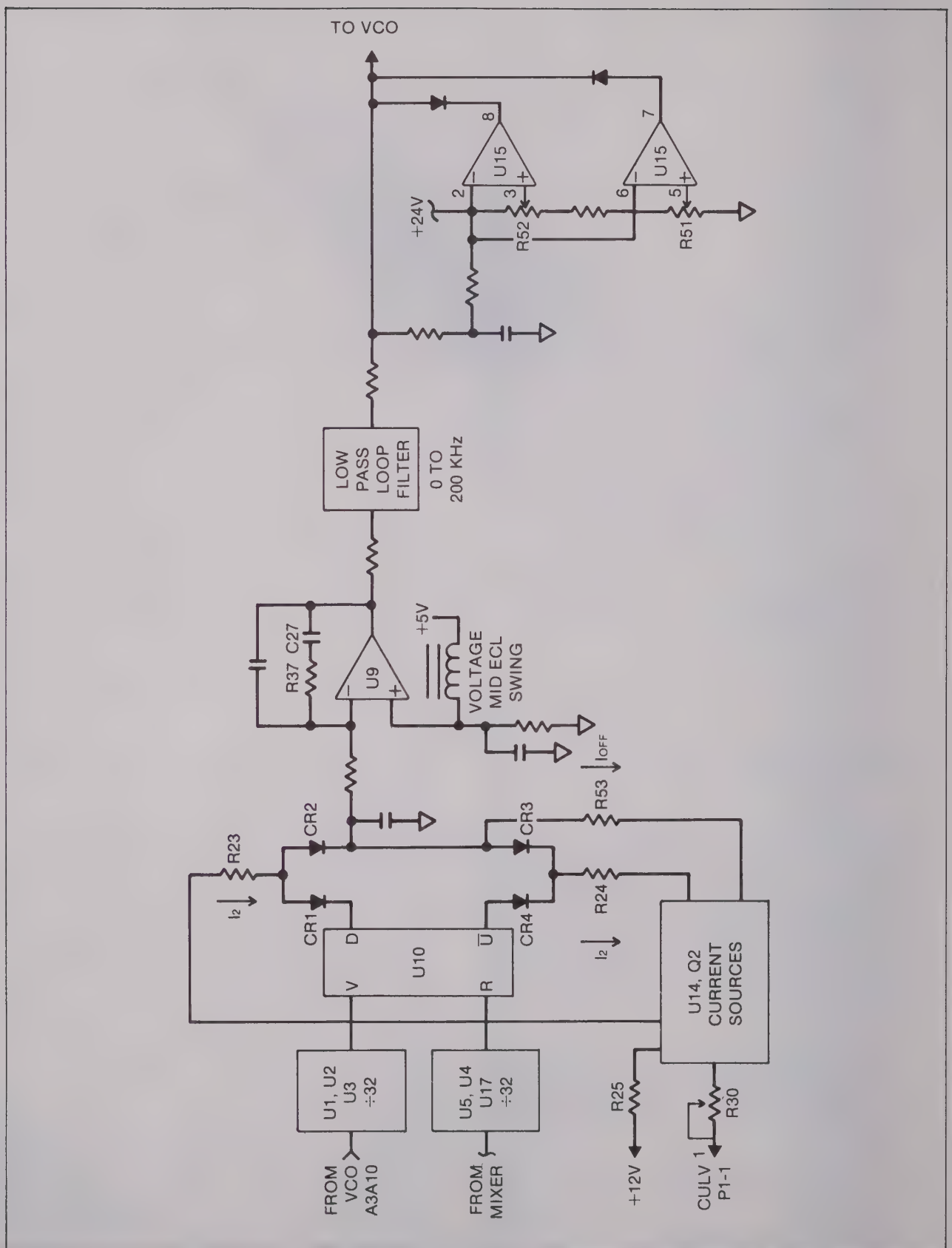


Figure 2-9. A3A6 Frequency/Phase Detector and Frequency Stops Circuit

2-244. The current sources (U14, Q2, CR5, and associated resistors) are designed so that the up current and the down current are equal and the offset current is about one-fourth of this value. The transistor Q2 is used for beta multiplication. The steady state phase detector pulse is therefore about 25 percent duty cycle. The offset avoids the crossover distortion which exists at zero pulse width in the frequency/phase detector. The current sources are controlled with a signal, CULCV (Cleanup-loop Compensation), at connector P1 pin 1. This signal controls the phase detector coefficient to compensate for the change in the VCO frequency-voltage coefficient to maintain constant loop bandwidth. The variable resistor R30 allows the matching of the cleanup loop bandwidth to that of the compensation circuit in the main loop phase detector. This matching provides flat angle-modulation frequency response. The optimum bandwidth for the cleanup loop is 30 kHz.

2-245. The output of the frequency/phase detector and switched current source drives the integrating operational amplifier U9. The positive input is biased in the middle of the frequency/phase detector ECL swing. The feedback, resistor R37 and capacitor C27 provide a low frequency breakpoint to increase the phase margin of the loop. The output of the operational amplifier U9 passes through the loop filter (C31 through C36 and L6 through L8) and the lead/lag network (R39, R58, R46, and C40) and then to connector J3, pin 1, to the VCO. The loop filter rejects the SSB spurious signals above 200 kHz. Rejection notches are located at approximately 200 kHz, 300 kHz, and 1 MHz. The lead/lag network has a lag break at about 36 Hz and a lead break at about 1450 Hz. This amplifier/filter combination provides good closed loop response and noise performance.

2-246. A speed-up network (double pellet diodes CR8 through CR11, R32, and R45) improves the switching speed for large frequency transitions. This network does not affect normal angle modulation signals because of the conduction voltage of the diodes.

2-247. The cleanup loop VCO frequency stops are formed by operational amplifier U15, diodes CR12 and CR13, and associated resistors. This circuit acts as active diode clamps on the control voltage to the VCO. The resistorR52 is used for adjusting the high end voltage (about 16 volts) corresponding to a high frequency of 535 MHz. The resistor R51 is used to adjust the low end voltage (about 2 volts) for the low end frequency of 235 MHz. These limits prevent loop lock up at frequency extremes where the VCO and divider operation is not predictable.

2-248. A3A7 Sub-Synthesizer PCB Circuit Analysis

2-249. Refer to the System Block Diagram and the A3A7 Syb-Synthesizer PCB Schematic located in the 6070A/6071A Schematic Manual.

2-250. The Sub-Synthesizer generates the low frequency signal which is summed in the A3A6 Single Sideband Mixer PCB to produce the five lower order digits (1 Hz, 10 Hz, 100 Hz, 1 kHz, 10 kHz) of frequency resolution. This loop is similar to the main loop in that it contains a single sideband mixer and pulse deleter in addition to the usual components of a phase-locked loop (phase detector, VCO and N/1).

2-251. The 10-MHz reference signal from the A3A2 10-MHz Reference PCB is transformed into a narrow pulse train by U2. This 10-MHz pulse train provides the input to a three-decade rate multiplier consisting of U10, U15, and U20. Integrated circuit U14 is used to compensate for the propagation delays of the rate multiplier. The individual rate multiplier provides an output pulse rate (Y) equal to one-tenth the BCD input (A, B, C, D = 1, 2, 4, 8). For example, when the BCD input number is 7, there will be 7 output pulses for every 10 input pulses and the average output frequency is 0.7 times the input frequency; lowever, these pulses are not evenly spaced in time. By cascading three rate multipliers, an average frequency of 0 to 9.99 MHz can be generated (U20-6) with a 10-MHz input. This is summed with 10 MHz in U21 to produce 10 MHz to 19.99 MHz at U21-1 (TP8). This is divided in two stages by 100 in U22, and U23, attentuated by L7, C32, R23, R24, and R39, and low-pass filtered by C33, C34, C36, C37, L8, and L9 to produce a 100 to 199.9 kHz sine wave. An active quadrature generator (U30, U31, R21, R22, R33, C23, C25, C40, and C41) generates two signals (TP5, TP6) with a 90-degree phase difference. This is fed into the single sideband mixer via R20, R29, C28, and C29.

2-252. The Sub-Synthesizer VCO consisting of Q6, tank L5-CR1, and associated components has a frequency range of approximately 80 MHz to 120 MHz. Its output is buffered by an ECL line receiver U34 to feed a divide-by-10, U32, and a divide-by-4, U29. The ECL output of U32 is transformed to TTL by Q1, and Q2 and again divided by 10 in U33 to provide the approximately 0.8 MHz to 1.2 MHz for the main loop single sideband mixer.

2-253. The divide-by-4, U29 provides two quadrature outputs that drive the LO inputs of mixer U27 and U28 via C26, R40, and C42, R43 respectively. The mixer outputs are summed with R25, R26, and R28 to produce a lower sideband (Fc – Fs) signal, where Fs can vary from 100 kHz to 199.9 kHz. Fc is the carrier signal, 20 MHz to 30 MHz or one-fourth the VCO frequency. This carrier signal is filtered by C46 through C50 and L10, L11 and is coupled into an ECL buffer U25 via C52. This buffer is used as an amplifier, and the ECL output is used to drive an ECL to TTL converter (Q3 through Q5 andassociated components). The TTL output is buffered by U19-6 and is fed into the pulse deleter (U3, U8, and U19-3).

2-254. This pulse deleter removes a pulse from the input signal, at U19 pin 6 at every negative transition of U8 pin

13. This causes U8 pin 9 to go high. On the next clock of the input signal, U8 pin 5 goes high, and on the following negative clock U3 pin 7 goes low, preventing the input signal from reaching U19 pin 3 and, therefore, deleting a pulse. As soon as U3 pin 7 goes low, it immediately clears the two previous flip-flops so on the next negative clock U3 pin 7 goes high, and pulses can reach U19 pin 3. This delete signal is supplied by rate multiplier U9 which is driven by the 1-MHz reference to produce delete rates from 0 to 900 kHz in 100-kHz steps.

2-255. The average frequency of the output of the deleter, U19 pin 3 is lower by the delete rate (Fd). This makes the deleter output frequency Fc – Fs – Fd. The deleter output drives the N/1 divider.

2-256. The programmable N/1 divider (U3, U5, U19-11, U19-8, and associated components) divides the deleter output frequency to a single frequency. The CK input of flip-flop U4 goes high when the counter reaches 27. The output of the flip-flop (U4 pin 8) goes low allowing a new number to be loaded into counter U5 on the next clock cycle (count 28). This causes the CK input of flip-flop U4 to go low. On count 29 the count-load line (U5 pin 1) goes high allowing the counter to resume counting. The larger the number that is loaded into the counter, the smaller number of counts the counter will take to reach the terminal count of 29. (i.e., If 0 is loaded the counter will divide by 29, and if 9 is loaded the counter will divide by 20 (a nines complement BCD system.)

2-257. The output of the N/1 is compared with the reference frequency (Fr) in the phase detector (U13 and U18). Since the two frequencies must be the same, the input to the N/1 (Fc – Fs – Fd) must be N*Fr. Therefore, Fc = N*Fr + Fs + Fd. The minimum values for N, Fs, and Fd are 20 kHz, 100 kHz, and 0 kHz, respectively. Therefore (since the reference frequency is 1 MHz) the L0 input to the single sideband mixer has a minimum frequency of 20.1 MHz. The VCO operates at 80.4 MHz and, in this case, the output to the main loop signle sideband mixer is 0.804 MHz. For the maximum values of 20 kHz, 199.9 kHz and 900 kHz, for N, Fs, and Fd respectively, the output is 1.203996 MHz.

2-258. The digital outputs of the phase detector, U18 pin 11, and U18 pin 6, are connected to a differential integrator consisting of U24 and associated components. The integrator output, which supplies the VCO control voltage, is filtered by C13, C14, C17C18, C19 and L3, L4, and is connected to the varactor CR1 to form a closed phase-locked loop. For troubleshooting, SW1 allows the loop to be opened and a fixed tuning voltage to be supplied to the VCO from R5. The operating point of the phase detector is set to approximately 2 radians by a small amount of leak current, from R8, which is summed into U24 pin 2. Under normal operation there should be 200 nS pulses at TP7 and U18 pin 8. These pulses are filtered by R50, C64 to produce approximately 1 VDC. This voltage is compared on the A3A9 Synthesizer Distribution PCB and, if it is outside the window of 0.8V to 1.2V, it indicates a Sub-Synthesizer unlock condition.

2-259. The Sub-Synthesizer is programmed by serial frequency information from the CPU via the A3A9 Synthesizer Distribution PCB and decoded in latches U7, U12, and U17. The information is transferred to the Sub-Synthesizer circuitry via a second level of latches U6, U11, and U16 at a time determined by a signal (TMCNTH) on the A3A4 N/1 Divider PCB.

2-260. A3A8 Synthesizer Control Buffer PCB Circuit Analysis

2-261. Refer to the System Block Diagram and the A3A8 Synthesizer Control Buffer Schematic located in the 6070A/6072A Schematic Manual.

2-262. The A3A8 Synthesizer Control Buffer PCB interfaces the control and status lines to the A3A2 10 MHz Reference PCB, the A3A3 Delay Discriminator PCB, and the A3A4 N/1 Divider PCB. The 10 MHz reference control lines are decoded by the addressable latch U4, and then are buffered by U3. Component U10 is also an addressable latch which is used for decoding the control signals to the A3A3 Delay Discriminator PCB. These control signals are buffered by U11. Data and select signals are buffered through U9 and sent to A3A4 via P2. DAC U6 is set by six bits from latch U1 and four bits from latch U4. The analog output is KNV (Main Loop Gain Compensation Voltage) which goes back through the A3A9 Synthesizer Distribution PCB, and from there goes to the A3A1 Phase Detector. The purpose of this analog voltage is to maintain a constant mainloop bandwidth by compensating for changes in the VCO tuning coefficient and the N/1 division ratio. DAC U7 is set by two bits from latch U1 and all eight bits of latch U2. The analog output is PHV (Phase Shifter DAC Voltage) and goes to the A3A3 Delay Discriminator PCB. Both of these voltages are derived from data stored in the calibration EPROM.

2-263. A3A9 Synthesizer Distribution PCB Circuit Analysis

2-264. Refer to the System Block Diagram and the A3A9 Synthesizer Distribution PCB Schematic located in the 6070A/6071A Schematic Manual.

2-265. All of the digital control lines, BABO to BAB5,, BDTA, BSEL2, BSEL3, BSEL5, and BSEL6, originate from the A2A1 Controller PCB. Some of these control lines are decoded by U2, are buffered through U13, and then are returned to the A3A7 Sub-Synthesizer PCB. Component U10 is an 8-bit addressable latch of which six outputs control the A3A1 Phase Detector through buffer U9. The output from latch U10-4 is used for the most significant bit of DAC U7. Components U1 and U4 are

also addressable latches, of which U4 provides the rest of the bits to U7, and U1 provides an 8-bit word to control DAC U3. DAC U3 provides the compensation voltage CULCV to the cleanup loop on the A3A6 Single Sideband Mixer which passes through the A3A8 Synthesizer Control Buffer and the A3A4 N/1 Divider. The input KVFM signal (Compensated FM Modulation Signal) is applied to DAC U7-15 via J16. DAC U7 provides the analog voltage PDFM which goes to the A3A1 Phase Detector to angle modulate the main loop. Three status lines are conditioned on the A3A9 Synthesizer Distribution PCB: SSPDV, DDINV, and DELVLV. Components U12-1 and U12-2 form a window comparator for SSPDV to produce a digital output SSULK (Sub-Synthesizer Unlocked Status). Component U12-13 digitizes the analog signal DILVLV to DIUNL (Discriminator Unlocked Status). The remaining statusline DDINV (Discriminator Invalid Status) triggers a retriggerable one-shot (U6) which is used as a pulse stretcher to provide a constant low level output DDNR (Discriminator Not Ready). The status indicators N1TST (N/1 cable continuity test bit), RNULK (10-MHz Reference Unlocked Status), and DIUNL (Discriminator Unlocked Status) from the A3A8 Synthesizer Control Buffer; SSULK (Sub Synth Unlocked Status) and STST from the A3A7 Sub-Synthesizer; and RPD (Reduce Peak Deviation Status) from the A3A1 Phase Detector are multiplexed by U11 for reading by the A2A1 Controller PCB.

2-266. A4A2 Modulation Oscillator PCB Circuit Analysis

2-267. Refer to the System Block Diagram and the A4A2 Modulation Oscillator PCB Schematic in the 6070A/6071A Schematic Manual for following the circuit analysis.

2-268. The internal modulation source of the Modulation Osillator is a programmable, low distortion two-integrator or phase-shift oscillator covering 20 Hz to 200 kHz, with overrange to 1 Hz and 255 kHz.

2-269. The time constants of the integrators (U13, U18, and associated components) which determine the output frequency, consist of C13 through C16, and C23 through C26 in conjunction with resistors in hybrids U10 and U14, respectively. Resistors R24, R27, and R28 provide bias current compensation for U13. Capacitors C18 and C28 are for high-frequency compensation of U13 and U18, respectively. The capacitors which determine the frequency ranges for U13 are switched by relay contacts K1B, K2B, and K3B. The capacitors which determine the frequency ranges for U18 are switched by relay contacts K1C, K2C, and K3C. The frequency ranges are listed in Table 2-8.

2-270. Relays K1, K2, and K3 are switched by open collector inverters, U2-2, U2-4, and U2-6, respectively. Diodes CR1 through CR3 protect the inverters from inductive transients. The resistors, which control the fine frequency steps in hybrids U10 and U14, are switched by quad DMOS switches. Resistors R1 and R2 bias the comparators at 1.5V so they can be switched by TTL levels. The bit weight, resistor value, and applicable control line are listed in Table 2-9.

Table 2-8. Frequency Ranges

FREQUENCY RANGE	CAPACITOR	RELAY	RESOLUTION
20 Hz - 199 Hz	C13, C23	K1	1 Hz
200 Hz - 1.99 kHz	C14, C24	K2	10 Hz
2.00 kHz - 19.9 kHz	C15, C25	K3	100 Hz
20.0 kHz - 199 kHz	C16, C26	——	1 kHz

Table 2-9. Resistor Value

BIT WEIGHT	RESISTOR VALUE	CONTROL LINE
128	1.5625 K Ohms	B7
64	3.125 K Ohms	B6
32	6.25 K Ohms	B5
16	12.5 K Ohms	B4
8	25 K Ohms	B3
4	50 K Ohms	B2
2	100 K Ohms	B1
1	200 K Ohms	B0
Note: The resistor value includes the FET on resistance		

2-271. Latches U1 and U2 convert the serial data from the microprocessor bus to parallel TTL.

2-272. A necessary condition for oscillation exists when the gain around the loop in unity and the phase shift is 0 degrees. Since each integrator provides –90 degrees phase shift, amplifier U8 must provide 180-degrees phase shift. Additional circuitry provides a mechanism to control the amplitude by slightly varying the phase shift about 180 degrees. The main feedback signal from U18 is summed into the inverting input with R20. Resistor R21 provides feedback around U8. Capacitor C22 is for high-frequency compensation. Resistors R19 and R23 are an offset voltage adjust circuit. A small amount of quadrature component from U13 is summed into the inverting input of U8 via R12 and into the non-inverting input with a voltage divider consisting of R13, R14, and R16. Resistor R16 is in parallel with the resistance of n-channel FET Q2. Resistors R15, R17 linearize the resistance of the FET Q2 as a function of gate-to-source voltage. By changing

the FET Q2 resistance, the magnitude and sign of the quadrature component summed in canbe varied, causing the amplitude of the oscillation to increase or decrease. The operating point of FET, Q2, which reflects the amount of quadrature component summed in, would be constant as a function of frequency if the integrating circuits of U13 and U18 and the inverters U13 and U18 were ideal. At low frequencies no net quadrature component is summed in, while at high frequencies the operating point changes to match the phase shift change in the loop caused by the nonideal behavior of the operational amplifiers.

2-273. The amplitude level control (ALC) loop consists of U6 and associated components. Operational amplifier U6A with diodes CR4 through CR7 and a portion of resistor pack U19 (10K Ohms) form a four-phase rectifier. The outputs of U18, U13, and U8, provide 0 degrees, 90 degrees, and 180 degrees, respectively. The output of U13 is inverted by U6D to give a 270-degree phase shift. The reference voltage from a 6.4V zener CR8, biased by R8, is summed into U6A by R7 and amplitude adjust potentiometer R6. P-channel FET Q1, controlled from open collector inverter U20 with pull-up U5, provides a means to turn the oscillator off by removing the reference. The voltage from temperature compensation diode CR9, biased by R10, is also summed into U6A with resistor R9. In the steady state, the DC output of U6A is zero.

2-274. If the system is perturbed so that the oscillator amplitude increases, the voltage at the output of U6A will decrease. The voltage at the output of integrator U6B will begin to ramp up, and consequently the voltage to the control FET Q1 will ramp down and tend to turn off the oscillator to maintain a constant amplitude. The reverse happens for an amplitude decrease.The integrator time constant is determined by R11 and C1 through C4. These capacitors are switched by relay contacts K1A through K3A to match the frequency band. Diodes CR10, CR11, and resistor R18 form a speed-up network used to improve the oscillator switching speed. The ALC loop stability is maintained by summing the nonintegrated signal into the noninverting input of U6C.

2-275. Output amplifier U17 has a gain of two and acts as a buffer to feed the front panel output. Resistors R25 and R26 set the gain of U17 and capacitor C22 provides frequency compensation.

2-276. A4A3 Attentuator PCB Circuit Analysis

2-277. Refer to the System Block Diagram and the A4A3 Attentuator Schematic located in the 6070A/6071A Schematic Manual.

2-278. The A4A3 Attentuator PCB provides the basic 6 dB level increments for controlling the instrument output. The total attenuation range, including one section on the A4A7 or A4A6 Output Amplifier PCB, is 0 to 138 dB. This is accomplished with one 6-dB section, one 12-dB section, and five 24-dB sections.

2-279. Control signals determining which attentuator sections are in or out of the circuit come from the A4A10 Modulation Distribution PCB. These TTL control signals are level shifted and applied to Q3 through Q8 which switch the current through the coils of relays K1 through K6. Relays K1 through K6 are DPDT relays wired in a transfer switch configuration. In the off or no coil current condition, the relay contacts are arranged so that the input RF signal enters the relay, goes through the attenuator pad, and exits the relay. In the "on" or coil current applied condition, the input RF signal passes directly through the relay contacts with no attenuation. The attenuator sections are "pi" pads with resistor values selected such that each pad exhibits a characteristic impedance of 50 ohms and the required attenuation factor. The attenuator sections are switched in and out individually in any combination corresponding to the attenuation required by the front panel or remote RF level setting.

2-280. A4A4 Modulator Divider PCB Circuit Analysis

2-281. Refer to the System Block Diagram and the A4A4 Modulator Divider PCB Schematic located in the 6070A/6071A Schematic Manual. The A4A4 Modulator Divider PCB (Mod Divider) is located on the A4 Output Module Plate.

2-282. The 250-MHz to 520-MHz signal from the A3A3 Delay Discriminator PCB enters the Mod Divider at J13 at a level of approximately 8 dBm into the resistive pad (R85, R86, and R87) and then into the junction of the pin diode switches (CR6, CR7, CR8, and CR9). Depending on which frequency band the desired output signal is the appropriate diode will be DC biased into conduction while the other diodes will be biased off. Diode CR8 enables the signal to reach modulator U10 when the frequency lies between 520 MHz and 360 MHz (A-Band). Diode CR7 enables modulator U4 when the signal lies between 360 MHz and 250 MHz (B-Band). If the frequency is between 250 MHz and 62.5 MHz (C, D, E, and F Bands), then diode CR6 enables the signal to reach dividers U15 and U14. For frequencies below 62.5 MHz (G-Band), diode CR9 enables the signal to reach modulator U18 and the A4A9 Heterodyne Converter PCB. The DC bias current to control the diodes passes down the signal lines and is returned to ground through L3 and R12.

2-283. In the fundamental bands (A and B) and the heterodyne band (G), the signal passes directly to the modulators. The hybrid modulators U4, U5, U10, U12, and U18 and dual gate FETs Q2 and Q3 act as wide range variable gain amplifiers to control the amplitude of the signal in response to commands from the automatic level

control (ALC) circuitry and to control amplitude modulation (AM). The output of each modulator passes through a low-pass filter to remove harmonic distortion present on the input signal or the divided signals. The A4A4 Modulator Divider PCB is a three-layer Teflon glass circuit board with each low-pass filter printed as a stripline structure in the center conductor layer. The PCB is covered on both sides by ground plane. The filter for the upper half octave of the fundamental band (A) is located ahead of the output connector J3 and passes all signals from 0.2 MHz to 520 MHz. The lower frequency filters (D, E, and F bands) use external ceramic capacitors as part of the filter structure. The outputs of each band are summed to a common point by pin diode switches CR10 through CR15. The DC bias to enable the output diodes is controlled by the appropriate modulator.

2-284. For a programmed frequency from 125 MHz to 250 MHz, the input signal 250 MHz to 500 MHz is divided by two in digital divider U15. The output of U15 is amplified by hybrid amplifier U13. The output of U13 is switched by pin diodes CR19 and CR20 to the appropriate modulator U5 or U12 and to their respective low-pass filters. When the programmed frequency is within therange of 62.5 MHz to 125 MHz, the 125-MHz to 250-MHz output of U15 is further divided by U14. The output of U14 is amplified by U11 and switched by pin diodes CR23 or CR24 to the gate of the appropriate FET modulator Q2 or Q3 and their respective filters. From switches CR10 to CR15 the signal goes through a high-pass filter and to pin diode switches CR18, CR25, and CR17. For frequencies from 0.2 MHz to 62.5 MHz, the signal is applied to J2 from the A4A9 Heterodyne Converter, then passes through low-pass filter FL1 and CR17 to amplifier U1 and to the output connector J3. The DC bias to enable CR18 and CR25 is controlled by Q5 and associated circuitry Q4 and U3.

2-285. When the output signal is in the heterodyne band, the A4A9 Heterodyne Converter senses the presence of the DC bias and control signal generated by U18 and passes it with the RF signal through connector J1. The A4A9 Heterodyne Converter then generates a DC control signal which comes into J2 and enables diode CR17 to conduct the 0.2-to 62.5-MHz signal to u1 and to the output connector J3.

2-286. The selection of the appropriate band to process the signal is accomplished by decoding the control data from A4A10 Modulation Distribution PCB on lines BAND1H, BAND2H, and BAND4H. The binary coded command is decoded into 1 of 7 by U16 generating 0 to 12 volt control commands on lines "A" through "H". These control commands pass through the appropriate modulator and turn on one of the output diodes CR10 through CR15, or CR2 and U1 on the A4A9 Heterodyne Converter PCB.

2-287. Command lines C through F are used to control dividers U15 and U14, transistor Q1, and input switch diode CR6 by means of diodes CR1 through CR5, CR21, and CR22.

2-288. The BAND control data is also decoded by analog switch U2 which connects the AM/ALC analog control line from the A4A7 Output Amplifier PCB (A4A6 Times Two Output PCB in 6071A only) to the input of the appropriate operational amplifier U6 through U9. These amplifiers generate analog control a through g varying from 0 to +10 volts and control the gain of the appropriate modulator and the bias current through input diodes (CR6 through CR9, CR19, CR20, CR23, or CR24). Control data BAND2H and BAND4H are further decoded by U3 to enable switch diodes CR18 and CR25 when the frequency is between 62.5 MHz and 520 MHz. Potentiometer R88 and selected resistors R3 through R9 are used to set the ALC loop gain in each band, dependent on the modulator transfer function and the total RF gain in each frequency band. Transistor Q6 responds to the "Times 2 Select" command X2SLH from the A4A10 Modulation Distribution PCB when the 6071A is in the 520-MHz to 1040-MHz band. When Q6 is turned off by X2SLH being true, it turns analog switch Q7 off which adds resistor R2 into the analog path to compensate the ALC loop gain in the 520-MHz to 1040-MHz band.

2-289. A4A5 Reverse Power Protection PCB Circuit Analysis (Option -870)

2-290. Refer to the System Block Diagram and the A4A5 Reverse Power Protection PCB Schematic in the 6070A/6071A Schematic Manual. The A4A5 Reverse Power Protection (RPP) PCB provides protection for the 6070A/6071A in the event that excessive RF or DC power is applied to the instrument RF output connector. This protection is valid up to an applied power level of 50watts maximum from a 50 ohm source. Protection from DC voltages up to ±50V DC is also incorporated, subject to the 50-watt maximum power rating.

2-291. There are three basic protection methods incorporated in the RPP. The first method is a diode limiter (CR1 through CR4 and CR11 through CR14). This limiter clamps the voltages applied, including fast rise time or pulsed signals, to a level which will not damage the instrument. The second method is the DC blocking provided by capacitors C17 and C18. The third method is provided by relay K1. When the RF level becomes high enough (approximately 0.5 watts), CR15 detects sufficient voltage to change the state of comparator U1. This causes latch U2 to change state. The change in state will turn off Q2 which turns off Q1 and removes the current drive to the coil of K1. When K1 releases, the RF line to the output connector is shorted to ground, and the RF line back to the instrument is opened. This effectively disconnects the instrument from the RF

output connector. A status signal from the latch, (RPTRPL) is sensed by the microprocessor which flashes the RF OUTPUT ON indicator and performs the RF off function. Pressing the RF OUTPUT ON indicator button will reset the latch U2 through the RPRSTL line if the source of RF power has been removed. Note that if the instrument is in stanby, or unplugged from power, K1 is de-energized and thus is in the disconnect state. The instrument is also protected in the RF OFF condition.

2-292. A4A6 Times Two Output Amplifier PCB Circuit Analysis (6071A Only)

2-293. Refer to the System Block Diagram and the A4A6 Times Two Amplifier PCB Schematic in the 6070A/6071A Schematic Manual. The A4A6 Times Two Output Amplifier PCB amplifies the 0.2-MHz to 520-MHz RF signal, and generates the 520-MHz to 1040-MHz signal. The times two output amplifier circuitry amplifies the signals to the level necessary to obtain the desired instrument output level. The PCB contains much of the automatic level control circuitry (ALC), and contains one attenuator (24 dB) section.

2-294. THE RF SIGNAL PATH

2-295. The 0.2-MHz to 520-MHz input signal comes from the A4A4 Modulator Divider PCB output (A4A4J3) and is connected to the output amplifier at E1E2. Components U1 and U2 are wideband RF amplifiers with approximately 7.5 dB gain each. The output of U2 goes to K1. Relays K1 and K2 are DPDT relays used to route the RF signal directly through to the detector U20 for frequencies less than 520 MHz and through the times two (X2) circuitry to the detector for frequencies of 520 MHz to 1040 MHz. Components T1, Q1, and Q2 and associated circuitry form an active frequency doubler. Transformer T1 splits the RF input signal into two opposite phase outputs which are applied to Q1 and Q2, respectively. The collectors os Q1 and Q2 are tied together summing the outputs. This forms a full-wave rectifier (or doubler). Amplifiers U5 and Q3 are used to control the current through the doubler circuit. As the rf drive level to the doubler increases, the collector current increases. This changes the doubler's gain characteristics. Controlling the current through the doubler tends to hold the doubler's gain constant as the RF drive level is varied. The doubler output goes to U3, a 520-MHz to 1040-MHz amplifier with approximately 7 dB gain. From U3, the RFsignal goes to a switch/bandpass filter matrix. As the signal generated in the doubler contains the input frequency and many unwanted harmonics, it is necessary to filter the signal. Four bandpass filters are required to cover the 520-MHz to 1040-MHz band. Bandpass filter (BPF) 1 is for frequencies between 520 MHz to 600 MHz, BPF 2 is for frequencies between 600 MHz to 720 MHz, BPF 3 is for frequencies between 720 MHz to 875 MHz, and BPF 4 is for frequencies between 875 to 1040 MHz. The drive for the pin diode switches is supplied from U11 through U14. The filtered RF signal is then amplified by U7 and U6 (520-1040-MHz, 7-dB gain amplifiers) and goes to relay K2 where it rejoins the main RF signal path. The signal from K2 goes to the detector U29 and R26. The network R26, C31, and R37 taps off a small (–20 dB) portion of the signal from K2 and connects it to E3E4 where it is available as the auxiliary RF output signal (Option 831). The main portion of the signal goes through the detector U20. The detector introduces approximately 3.5 dB loss to the RF signal. From the detector, the RF signal goes to relay K3, a DPDT relay. In the normal operating mode, the RF signal passes directly through K3. Anytime a signal level is requested which exceeds +13 dBm (or +7 dBm in the X2 band), K3 is energized and the signal passes through U9 which is a wideband RF amplifier with approximately 6 dB gain. This post detector gain block is necessary to reach signal levels greater than +13 dBm (or +7 dBm in the X2 band). From K3, the RF signal goes to K4 which, together with R43, R44, and R45, forms a switchable 24-dB attenuator section. From K4, the RF signal exits the A4A6 Times Two Amplifier PCB at connector J2 and goes to the A4A3 Attenuator PCB.

2-296. AUTOMATIC LEVEL CONTROL (ALC) LOOP

2-297. The detector U20 contains two RF diode detector circuits. One section is used when the RF frequency is less than 5 MHz and the other is used for frequencies greater than, or equal to 5 MHz. The detector circuits are the same except for coupling and bypass capacitor values. Both detectors are on the RF line permanently and their outputs are switched by Q4 and Q5. The detector also contains a temperature compensation diode, the output of which is summed with the detector diode output at the common source of Q4 and Q5. U15 is a buffer amplifier. Amplifier U16, together with the resistor/diode network connected between U16 pin 6 and U16 pin 2, forms a linearization circuit. This circuit takes the output of the detector diode, which is nonlinear with varying power levels, and transforms it to an output which is linear as RF output level is varied. (This is necessary to keep the ALC loop gain relatively constant.) The output of the linearizer goes to U17. Integrated circuit U17 and associated circuitry form the loop integrator. The loop control signal (1+AM), which comes from the A4A10 Modulation Distribution PCB, is summed with the linear detector output at U17, and the error signal (AM/ALC) is applied to the A4A4 Modulator Divider PCB. The error signal is further processed on the A4A4 Modulator Divider PCB and applied to the RF modulators to control the gain of the modulators. The RF output of the A4A4 Modulator Divider PCB is applied to the A4A6 Times Two Output Amplifier PCB and thereby completes the ALC loop. As the detector bandwidth is much lower when frequencies less than 5 MHz are requested, the integrator must set a lower loop bandwidth to obtain stability. This is done by switching capacitors C22, C78, C23, C75 via Q10 and

Q11. These capacitors then parallel the normal integration capacitors C74 and C79, reducing the loop bandwidth by approximately a factor of 10. Integrated circuit U18 and associated circuitryform an unleveled indicator circuit. When the loop error voltage is within the normal operating boundaries, the output of U18 is low. If the loop unlocks, the error voltage goes toward –12V dc, tripping U18. The output of U18 goes to approximately +5V dc. This is sensed by the instrument controller and provides an "Output Amplifier Unleveled Status" (UNLVL) indication.

2-298. COMMANDS/CONTROLS

2-299. The mode of operation controls for the A4A6 Times Two Output Amplifier PCB are provided from the A4A10 Modulation Distribution PCB. The attenuator select line A242 commands the 24-dB attenuator section. A TTL low on this line inserts the attenuator in the circuit; a TTL high removes the attenuator from the circuit. The output amplifier 6-dB gain select line (G6DBH) controls the 6-dB gain block. A TTL high on this line inserts the 6-dB gain block. A TTL low removes the 6-dB gain block. , The low heterodyne select line (LOHETH) line controls the detector and loop bandwidth functions. A TTL low on this line corresponds to frequencies 5 MHz and greater; a TTL high on this line corresponds to frequencies less than 5 MHz. The CW select filter (CWFLT) line controls the insertion of a filter capacitor on the 1+AM line. A TTL high on this line adds the capacitor to provide extra noise filtering when in the CW mode; a TTL low removes the capacitor allowing AM control signals to reach the loop. Doubler Select X2SL inserts and removes the doubler circuit from the RF path. This is programmed high when frequencies of 520 MHz or greater are selected. Doubler filter select FLSL1 and FLSL2 control the selection of the bandpass filters in the times two mode. The two command lines are decoded in U10 to select one of the four filters. The level control reference voltage 1+AM is the composite level control, and AM control analog voltage.

2-300. A4A7 Output Amplifier PCB Circuit Analysis (6070A Only)

2-301. Refer to the System Block Diagram and the A4A7 Output Amplifier PCB Schematic in the 6070A/6071A Schematic Manual. The A4A7 Output Amplifier PCB amplifies the RF signal to the level necessary to obtain the desired instrument RF output level. The amplifier contains much of the automatic level control (ALC) circuitry, and contains one attenuator (24 dB) section.

2-302. RF SIGNAL PATH

2-303. The RF Input signal (0.2 MHz to 520 MHz) comes from the A4A4 Mod Divider PCB (A4A4J3) and is connected to the output amplifier at E3E4. Components U1 and U2 are wideband RF amplifiers with approximately 7.5 dB gain each. The signal from U2 goes to the detector (U3) and resistor R1. The network R1, C43, and R3 taps off a small (–20 dB) portion of the signal from U2 and connects it to E1E2 where it is available as the auxiliary RF output signal (Option 831). The main portion of the signal goes through the detector U3. The detector function is discussed under the heading ALC Loop. The detector introduces approximately 3.5-dB loss to the RF signal. From the detector, the RF signal goes to K1, a DPDT relay. In the normal operating mode, the RF signal passes directly though K1. Any time a signal level is requested which exceeds +13 dBm, relay K1 is energized and the signal passes through U6. Amplifier U6, together with the attenuator pad (R50, R51, R52), forms a 6 dB gain block. This post detector gain block is necessary to reach signal levels greater than +13 dBm. From relay K1, and RF signal goes to relay K2 which (together with resistors R31, R32, and R33) forms a switchable 24-dB attenuator section. From relay K2, the RF signal exits the output amplifier PCB (J2) and goes to the A4A3 Attenuator PCB.

2-304. AUTOMATIC LEVEL CONTROL (ALC) LOOP

2-305. The detector U3 contains two RF diode detector circuits. One section is used when the RF output frequency is less than 5 MHz and the other is used for frequencies greater than, or equal to, 5 MHz. The detector circuits are the same except for coupling and bypass capacitor values. Both detectors are on the RF line permanently, and their outputs are switched by Q1 and Q2. The detector also contains a temperature compensation diode, the output of which is summed with the detector diode output at the common sourceof Q1 and Q2. Amplifier U5, together with the resistor/diode network connected between U5 pin 6 and U5 pin 2, forms a linearization circuit. This circuit takes the output of the detector diode, which is nonlinear with varying power levels, and transforms it to an output which is linear as RF output level is varied. (This is necessary to keep the ALC loop gain relatively constant.) The linear output goes to U7. U7 and associated circuitry form the loop integrator. The loop control signal (1 + AM), which comes from the A4A10 Mod Distribution PCB, is summed with the linearized detector output at U7 and the error signal (AM/ALC) is applied to the A4A4 Modulator Divider PCB and to the RF modulators that control the gain of the modulators. The RF output of the A4A4 Modulator Divider PCB is applied to the A4A7 Output Amplifier PCB input (A4A7E3E4), thereby completing the ALC loop. The detector bandwidth is much lower for frequencies less than 5 MHz, thus, when these frequencies are requested, the integrator sets a lower loop bandwidth to obtain stability. This is done by switching in capacitors C35, C52, C24, and C51 via Q4 and Q5. These capacitors then parallel the normal integration capacitors C23 and C25 reducing the loop bandwidth by approximately a factor of 10.

2-306. Integrated circuit U9 and associated circuitry form an unleveled indicator circuit. When the loop error voltage is within the normal operating boundaries, the output of U9 is low. If the loop unlocks (loses control), the error voltage goes toward –12V dc, tripping U9. The output of U9 goes to approximately +5V dc. This is sensed by the instrument controller and provides an Output Amplifier Unleveled Status (UNLVL) indication.

2-307. COMMANDS/CONTROLS

2-308. The mode of operation controls for the A4A7 Output Amplifier PCB are provided from the A4A10 Modulation Distribution PCB. The attenuator select line A242 commands the 24-dB attenuator section. A TTL low on this line inserts the attenuator in the circuit; a TTL high removes the attenuator from the circuit. The output amplifier 6-dB gain select line (G6DBH) controls the 6-dB gain block. A TTL high on this line inserts the 6-dB gain block. A TTL low removes the 6-dB gain block. The low heterodyne select line (LOHETH) controls the detector and loop bandwidth functions. A TTL low on this line corresponds to frequencies 5 MHz and greater; a TTL high on this line corresponds to frequencies less than 5 MHz. The CW select filter (CWFLT) line controls the insertion of a filter capacitor on the I+AM line. A TTL high on this line adds the capacitor to provide extra noise filteringwhen in the CW mode: a TTL low removes the capacitor, allowing AM control signals to reach the loop. I+AM is the composite level control and AM control voltage.

2-309. A4A8 Heterodyne Oscillator PCB Circuit Analysis

2-310. Refer to the System Block Diagram and the A4A8 Heterodyne Oscillator PCB Schematic that is located in the 6070A/6071A Schematic Manual. The A4A8 Heterodyne Oscillator PCB serves two purposes. It provides direct coupled frequency modulation (DCFM) capability at all output frequencies and serves to heterodyne the synthesizer signal from the fundamental band to the lowest frequency, or heterodyne band. The board is located on the inside plane of the Output Module.

2-311. When the instrument is first turned on, broadband noise is amplified by the amplifiers in the oscillator loop (Q3, U13, U20, U21 and associated components). This noise is filtered preferentially at 520 MHz by the Surface Acoustic Wave Delay Line (SAWDL), U12, and continues to build in amplitude until the limiting level is reached (in the same manner as any conventional oscillator). Part of the signal is split off at the output of the low noise amplifier (Q3) by the 3 dB hybrid coupler (W1). This signal is adjusted to the desired level by a resistive pad, and buffered by U14 before being output at J1 to the A4A9 Heterodyne Converter PCB. The rest of the signal is amplified by U20, which is followed by a resistor pad to adjust signal level and to insure a proper termination for the amplifier. The next hybrid coupler (W2) splits the signal into two output ports. The signal from one W2 port is amplified by U21, passes through a mechanically switched phase shifter (used in initial setup and for long term aging compensation), is amplified by U13, and is fed to the SAWDL, thus completing the oscillator loop.

2-312. The signal from the other W2 port is amplified by U18, and fed to the divide-by-52 circuit. The divide-by-52 output of 10 MHz is presented to phase detector U19 along with a 10 MHz reference derived from the instrument's master clock (A3A2 PCB). The phase detector output goes to the loop filter, half of U23, and through an FET switch (U11) to be summed with the temperature compensation signal at the input to the other half of U23. The output of this amplifier is applied to the electronic phase shifter, closing the phase locked loop (PLL). The electronic phase shifter, used for both phase locking and DCFM, is connected to the remaining port of the hybrid coupler W2. Modulation signals are applied to the input port of the coupler through an isolating RF choke. Board temperature is sensed by a thermistor, and the compensation signal is conditioned by U6. This circuitry also provides a frequency centering function used during alignment.

2-313. The Control Logic (Q1, U7, U8, U15) and the Center Frequency Calibrate (CF Cal) circuitry set up board operation depending upon the presence of the command signals for DCFM (DCFML) or heterodyne band (HETL). When DCFM operation is required, the line identified as DCFM is brought low. This results in the generation of two output pulses by the dual monostable multivibrator (U7). One of these pulses (about 4 microseconds in duration) is used to initialize the CF Cal circuitry. The other pulse (about 140 milliseconds long) is first used to enable a clock generator (U1). The output pulses from clock generator U1 are counted by a binary counter composed of U2and U9. As this counter counts up, its output is converted to a ramp signal by the digital to analog converter U3 and U4. The ramp voltage is compared by U10 to the voltage present at the output of the PLL filter loop (U23-1). When these voltages are equal, the comparator (U10-7) output changes state and stops the clock, thus freezing the counter, and thereby the ramp. A short time later, the 140-ms pulse comes to an end, allowing the FET switch, U11 to change position, substituting the frozen ramp voltage for the previously existing PLL control voltage. Thus, when going to the DCFM mode, the oscillator is no longer phase locked to the 10-MHz standard, but its frequency is held to very nearly the same value. This is done because if frequency modulation was attempted while locked, the modulation frequency response would be adversely affected by the PLL action. At the same time, the unneeded incoming 10-MHz standard signal is turned off by Q1, which sends a command back to the source via the signal line, thus

preventing possible spurious signal generation. At this time the instrument software also enables the modulation signal path, and the A4A8 Heterodyne Oscillator frequency will be modulated accordingly. For all instrument output frequencies not in the Het band, the output from this board is the variable 10 MHz output at J5. This signal is then used as the reference for the main synthesizer, thus modulating the output frequency of the instrument. This line is disabled at the receiving end when not required, to minimize spurious outputs. When operating in the heterodyne band, the control line identified as HETL is brought low. Unless DCFM is also commanded, there is no effect on the board. If DCFM is commanded, at the end of the CF Cal cycle, the divide-by-52 circuit is turned off, because now the output is taken from J1 and used in the A4A9 Het Converter to mix with the synthesizer signal to produce the output signal directly.

2-314. As the amplitude versus frequency characteristics of the SAWDL exhibit substantial unwanted responses above and below the desired frequency, precautions must be taken to insure that operation occurs only at the desired point. This is complicated by the fact that the power supply voltages do not come up exactly at the same time during turn-on, which allows control voltages to momentarily exist outside their normal ranges. This can result in the oscillator coming up on an incorrect frequency, outside the control range of the PLL. To eliminate this possiblity, the instrument software causes a CF Cal cycle (by exercising the DCFML line) at turn-on after allowing time for the power supplies to settle down.

2-315. A4A9 Heterodyne Converter PCB Circuit Analysis

2-316. The A4A9 Heterodyne Converter mixes frequencies from the A4A8 Heterodyne Oscillator PCB and the A4A4 Modulator Divider PCB, and the frequency difference is applied back to the A4A4 Modulator Divider PCB. Refer to the System Block Diagram and the A4A9 Heterodyne Converter Schematic located in the 6070A/6071A Schematic Manual.

2-317. The 520-MHz local oscillator signal from the A4A8 Heterodyne Oscillator enters the A4A9 heterodyne Converter PCB at a level of approximately 7 dBm. The signal is applied to gate 1 of dual gate DMOS FET amplifier Q2, then travels through C11 matching capacitor to gate 2 of DMOS FET Q1. The output of Q1 goes into a printed stripline resonator that is tuned by capacitor C15. The resonator output goes through a printed stripline low-pass filter and a resistive matching pad into the local oscillator inputof double balanced, high level mixer U2 at a level of approximately +17 dBM. Potentiometers R42 and R6 adjust the gain of amplifiers Q1 and Q2 by varying bias conditions.

2-318. The bias on gate 1 of Q1 and gate 2 of Q2 is switched to turn off the local oscillator signal to the mixer when the A4A9 Heterodyne Converter is not used.

2-319. The 457-MHz to 520-MHz linear input (RF) signal to the mixer enters through A4A9 pin 1 from the A4A4 Modulator/Divider PCB. A DC control current is drawn by the Modulator/Divider when the Heterodyne Converter is enabled. This control current is sensed by comparator U1 and associated circuitry and switches on the local oscillator amplifier and the output amplifier. This variation of the DC control current varies conduction of diode CR2, which in turn varies the level of the signal into the mixer. Inductors L3, L12, and capacitor C9 form a high-pass filter to supress the feedthrough of the amplitude modulation. A printed stripline low-pass filter supresses harmonic components on the RF input to mixer U2.

2-320. The output of mixer U2 consists of the undesired sum frequency component which is resistively terminated in R23 and R46. The desired difference frequency component of 0.2 MHz to 62.5 MHz goes through low pass filter L4, and L6, amplifiers Q4 and Q5, low-pass filter L7 and L8, and out through A4A9P2 to the A4A4 Modulator/Divider. A DC control current is fed from the A4A4 Modulator/Divider when the A4A9 Heterodyne Converter is enabled.

2-321. A4A10 Modulation Distribution PCB Circuit Analysis

2-322. Refer to the System Block Diagram and the A4A10 Modulation Distribution PCB Schematic located in the Schematic Manual. The A4A10 Modulation Distribution PCB provides processing for the AM (including level) and FM audio modulation signals. Also, all control bits for the other output plate circuit boards are latched and distributed from this board.

2-323. The audio input form the A1A1 Front Panel Assembly or the A6 Rear Panel Assembly is AC coupled with C1, C2 to a termination resistor R15. The DCCUPH bit controls relay K3 which allows DC coupling. Quad DMOS switch U33 routes the audio signal from the external input or internal modulation oscillator (J2 pin 1) to either the FM depth DAC U25 (EXTFMH, INTFMH) or the AM Depth DAC (EXTAMH, INTFMH). This switch is controlled from latch U38, with level shifter U35 converting the TTL levels to ±12V. When the delay discriminator is switching, DDNRL is asserted (low) which inhibits the FM modulation with gate U36.

2-324. The FM depth DAC U25 is a 10 bit CMOS multiplying DAC, or digitally controlled attenuator, which provides fine control of the FM modulation index, or deviation (MDFMO-9H). These multiplying DACs produce a current, I01 (U25 pin 1), equal to the voltage input, VR (U25 pin 15), divided by the DAC ladder

resistance, multiplied by N/2n, where n is number of bits in the DAC and N is the binary input to the DAC ($0 \leqslant N \leqslant 2n-1$). This current output is connected to the inverting input of the operational amplifier U26 pin 2. The feedback RF (U25 pin 16) resistor, which is the same resistance as the DAC ladder, is internally connected in the DAC to IO1. This resistor supplies current from the output of the operational amplifier, U26 pin 6 via an attenuator network (R8, R11, and R14) which also determines the scale factors. This attenuator network, which is in the feedback path, increases the gain of the circuit over what it would be if the feedback resistor Rf were directly connected to the output of the operational amplifier. In this case, the gain with FETs Q5 and Q6 off is –4 (4/5 scale factor). With Q6 on (SFX1H set high), the gain is –5 (1 scale factor). With Q5 on (SFX54H set high) and Q6 off, the gain is –6.25 (5/4 scale factor). These scale factor bits are used to compensate for various combinations of FM deviation ranges and RF frequency bands. For example, in the fundamental band, 250 MHz through 519 MHz, the gain is –5. Potentiometer R41 adjusts the offset voltage and C13 is used to compensate the high frequency response. Schottky diode CR10 protects the DAC from power turn-on voltage transients.

2-325. The output of the FM depth circuitry is connected to a selectable ±1 gain stage consisting of U23 and associated circuitry. When Q7 is on, the noninverting input, U23 pin 3, is grounded and U23 is a conventional inverting operational amplifier with R18 the input resistor and R17, R44 the feedback resistors. When the FET is open the input signal appears at the noninverting input, U23 pin 3. The same signal must appear at the inverting input, U23 pin 2. Since no current can flow into the operational amplifier, the output signal must equal the input signal, a gain of +1. The gain is nominally set to –1 by programming the FMINUL bit high, which makes the phase of the signal to the KV DAC (J10) the same as the input, except when in the heterodyne band (RF out <62.5 MHz). The ± gain balance is set by R44. Resistors R46 and R61 provide offset adjustment in the –1, +1, mode, respectively. Capacitors C23 and C31 provide frequency compensation.

2-326. The output of the ±1 gain amplifier U23 is connected to the KV DAC on the A3A9 Synthesizer Distribution PCB and to the noninverting input of the DCFM buffer, U18 pin 2, with R45 and FET Q10. When HETMDL is asserted (low), Q10 is on and Q11, a p-channel FET, is off. This path is used when in the heterodyne band where the modulated A4A8 Heterodyne Oscillator output at 520 MHz is mixed with the unmodulated synthesizer plate output to produce a signal in the 0.2 MHz to 62.5 MHz region.

2-327. The audio from the ±1 gain amplifier is also connected to an equalization network (U19, U24, and associated components). This network, which compensates for the effect of the tracking phase-locked loop following the signal sideband mixer, is identical to that on the A3A1 Phase Detector PCB. The output of this network is connected to a multiplying DAC U12 which compensates for the multiplication factor of the synthesizer phase-locked loop. When the synthesizer is operating at 250 MHz and has a FM deviation of 100 kHz, the DCFM oscillator deviates 4 kHz with respect at 10 MHz, a multiplication factor of 25. When operating at 500 MHz, the DCFM oscillator deviates 2 kHz. The NIDAC is programmed to 960 and 480, respectively, to reflect the required 2:1 change in deviation as a function of frequency. The output of the NI DAC, U19 pin 1, is connected to the DCFM buffer, U18 pin 1, via R35, R48 and FET Q4. When REFMDL is asserted (low), Q4 is on, and Q3 is off. The REFMDL signal path is used when not in the heterodyne band where the modulated A4A8 Heterodyne Oscillator output at 10 MHz provides the reference to the synthesizer via the A3A1 Phase Detector PCB. The REFMDL signal path provides DCFM for modulation rates which are inside the main phase locked loop bandwidth. Resistor R48 adjusts the DCFM deviation. For rates outsidethe loop bandwidth, the modulation occurs on the A3A3 Delay Discriminator PCB. Resistors R43 and R50 adjust the offset voltage for the equalization network and NI DAC respectively.

2-328. The DCFM buffer is an inverting amplifier which provides the FM ranging and adjustment for the A4A8 Heterodyne Oscillator PCB. FET Q8 is closed except in the 500 kHz range where it is opened to increase the gain by a factor of 2. Potentiometer R33 adjusts the 500-kHz deviation, and the R31 adjusts all other frequency range deviations. The other ranges are determined by hybrid U41, relays K1, K2, and DMOS switch U1. The controlled frequency ranges are shown in Table 2-10. (Additional range control, outside the loop bandwidth, for DCFM on the non-heterodyne bands is covered in the A3A3 Delay Discriminator PCB Circuit Analysis, and range control for ACFM cases is covered in the A3A1 Phase Detector PCB Circuit Analysis.)

2-329. The relays are controlled by U10, and the DMOS switch is controlled by U2. The output of the buffer is sent to the A4A8 Heterodyne Oscillator PCB. Potentiometer R54 is for offset voltage adjust.

2-330. The input signal is also coupled to the AM Depth DAC (AMDO-9H), U27 pin 15, U28 and associated circuitry. This DAC, which controls the percent AM modulation, is similar to the FM depth DAC in that there is an attenuator network (R47 and R27 in parallel with R22 and R21) in the feedback path. This stage has a gain of approximately –1.33 at 100 percent AM (AMD = 1000).

2-331. Part of this network is used to sum a DC reference voltage from zener CR8 with the input signal.

Potentiometer R22 adjusts the AC/DC ratio or percent AM modulation. The input signal plus DC reference, which represents (1 + am), is connected to the level DAC input, U29 pin 17. This 12-bit DAC (LEO-11H), in conjunction with operational amplifier U30, controls the vernier RF output level. The four most significant bits are latched separately in U22 and are clocked to the level DAC by the LECHKH bit to minimize level glitches. This stage has adjustable gain from -1 to -2 for level calibration (with R25). This signal provides the reference for the instrument ALC loop on the A4A7 Output Amplifier PCB or A4A6 X2 Output Amplifier PCB.

Table 2-10. Frequency Range Control

RANGE	BIT	CONDITIONS
500 kHz	HETRN5H	Q8 open, K1 closed
250 kHz	HETRN4H	Q8 closed, K1 closed, all others open
100 kHz	HETRN3H	Q8 closed, K2 closed, all other open
50 kHz	HETRN2H	Q8 closed, U1-3 closed, all others open
25 kHz	HETRN1H	Q8 closed, U1-6 closed, all other open
10 kHz	HETRN0H	Q8 closed, U1-11 closed, all others open

2-332. The serial data (BDTAH) and low order address bits (BABOH,1H,2H) from the A2A1 Controller PCB are buffered by U11 and sent to all the latches (74LS259). The three high order address bits (BAB3H,4H,5H) are connected to a pair of 1-out-of-8 decoders, U39 and U40 which are selected by BSEL6L and BSEL5L respectively. The outputs of the 1-out-of-8 decoders are used to enable the various latches. By using this hierarchy, any bit can be set. The outputs of the latches which are connected to other PCBs are buffered by U9, U6, and U17.

2-333. 6070A/6071A Power Supply

2-334. INTRODUCTION

2-335. The 6070A/6071A Power Supply is made up of a basic power supply and associated voltage regulators located in the rear panel assembly. The following description is a circuit analysis of the 6070A/6071A PowerSupply. The power supply contains the following printed circuit boards: A5A1 Power Supply Assembly, A5A2 Power Supply Regulator Assembly, A5A3 Auxiliary Transformer Assembly, A5A4 Input Rectifier Assembly, A5A5 Switching Transistors Assembly, and A5A6 Power Supply Capacitor Assembly. The voltage regulators are A6A2 Series-Pass Motherboard, A6A3 +5 Volt Series Regulator, and the A6A4 +12V, -12V, +24V Series-Pass Regulator. The schematics for the power supply and the voltage regulators are located in the 6070A/6071A Schematic Manual.

2-336. The 6070A/6071A uses a high efficiency switching power supply followed by conventional series-pass regulators to minimize heat dissipation in the instrument. The switching power supply uses pulse-width modulation to control its output as its ac line voltage changes. This makes it possible to maintain a minimum amount of voltage across the pass transistors in the series-pass regulator. The power supply can operate from various line power configurations. Line power voltage can be from 90V to 132V AC rms or from 180V to 264V AC rms. Line frequency can be 47 Hz to 63 Hz. The power supply is usually factory set to operate with a line voltage of 90V to 132V AC rms. The 6070A/6071A has a voltage selection switch located on the rear panel adjacent to the main power fuse. For 180V to 250V AC rms operation, the voltage selection switch must be set to the 230V position.

2-337. SWITCHING POWER SUPPLY OVERVIEW

2-338. Figure 1-3 in the 6070A/6071A Schematic Manual shows the block diagram of the entire power supply. AC voltage is applied to the bridge/doubler rectifier CR1 through a RFI line filter. The rectified output voltage charges the energy storage capacitors, CR3, CR4, and this raw DC voltage is fed, through a common mode noise filter, to the switching power transistors. The switching transistors and the energy storage capacitors form a half-bridge configuration.

2-339. Line voltage regulation is provided by the pulse width modulator. The operation of the pulse width modulator is such that as the AC line voltage goes up, the pulse width becomes narrower, and as the AC line voltage goes down, the pulse width becomes wider. A typical voltage waveform at the primary side of the switching transformer is shown in Figure 2-10.

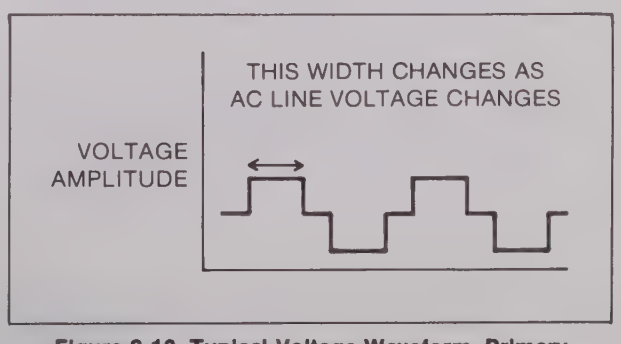


Figure 2-10. Typical Voltage Waveform, Primary Switching Transformer

2-340. The current waveform is similar to the voltage waveform and the amplitude is proportional to the power supply load current. The same voltage waveform appears at the secondary windings of T3 with voltage amplitude equal to the voltage at the primary multiplied by the transformer's turns ratios. The secondary output is full-wave rectified and is fed to the ripple suppression filter where the switching frequency and its harmonic components are filtered. Then each DC voltage is brought to the output terminal through a common mode noise filter.

2-341. The voltage regulation is achieved by monitoring the rectified +6 volt line. The output of the +6 volt rectifier is filtered by a ripple rejection filter (L2 through L6), and fed to an error amplifier U2 where this output voltage is compared against the reference voltage set by R7. This yields a control voltage to the pulse width modulator. The pulse width modulator (U1) provides pulses whose widths are inversely proportional to the control voltage. The output pulses from the pulse width modulator are appliedto switching transistors (Q1, Q2) through transformers (T1, T2). The switching transformer and driver transformer maintain isolation between AC line and chassis ground.

2-342. In order for this power supply to start, an auxiliary power supply, A5A3, provides +12V through CR8 to energize the pulse width modulator error amplifier (U1) before it transfers to the switching power supply output (+13V DC) through CR11 of A5A2. The A5A3 Auxiliary Power Supply also provides +24V DC to the oven oscillator (Option -130) when the instrument power cord is connected to AC line power and the rear panel POWER switch is set to ON.

2-343. Overload protection is provided in this power supply by monitoring the primary current (with T4) of the switching transformer. As soon as the current sense level exceeds the preset reference level (due to a fault or other overload) the pulse width modulator is disabled and the switching action is stopped. This overload condition is sampled at an interval of approximately two seconds, and the power supply is returned to normal operation as soon as the overload condition is removed.

2-344. Due to the limited amount of inductance available for the ripple suppression filter, the power supply output should be loaded with appropriate loads when the power supply is disconnected from the rest of the instrument. The minimum load requirements are listed in Table 2-11.

2-345. Either the synthesizer plate or the output plate is adequate to satisfy the minimum load requirement. If neither of these plates are connected, the dummy loads shown in Figure 2-11 are recommended.

Table 2-11. Minimum Load Requirements

OUTPUT	CURRENT (mA)
+6V/+5V	100 mA
-13V/012V	200 mA
+25V/+24V	98 mA

2-346. SERIES-PASS REGULATORS OVERVIEW

2-347. Refer to the Schematics for the following printed circuit boards: A6A2 Series-Pass Motherboard PCB, A6A3 +5 Volt Series-Pass Regulator PCB, A6A4 +12V, -12V, +24V Series-Pass Regulator PCB and the Power Supply Assembly Schematic. These schematics are located in the 6070A/6071A Schematic Manual.

2-348. Nominally +6V, +13V, and +25V dc are each applied to their respective pass transistors. Zener diode CR1 is used to create a reference voltage for the +24 volt regulator, which in turn provides the reference for the other regulators. The output of the +24V DC line is monitored and compared with the reference voltage at the error amplifier U3 whose output is negatively feedback to the pass transistor Q5.

2-349. The +24V DC is used as the reference voltage to a +12 volt regulator through a voltage divider. The +12 volt regulator is monitored and compared the same way as the +24 volt regulator. The +12V DC line is then used as the reference voltage to the -12 volt regulator and all +5 volt regulators. Operation of these regulators are essentially the same as the +12 volt and +24 volt regulators. The output voltages of all series-pass regulators are monitored for possible shorts in the loads. If the output of a regulator is shorted to ground, the switching power supply output voltages are reduced to a safe level that the pass transistor can withstand. When the short is removed, the power supply resumes its normaloperation.

2-350. The instrument also features a thermal shutdown circuit which is located on the controller (A2A1 PCB in the front panel assembly). When the internal temperature exceeds the preset temperature, the output signal of this circuit disables the pulse width modulator, and the instrument goes into standby until the temperature drops several degrees. Then the instrument resumes its operation.

2-351. A5A4 INPUT RECTIFIER PCB CIRCUIT ANALYSIS

2-352. The schematic for the A5A4 Input Rectifier is located in the 6070A/6071A Schematic Manual.

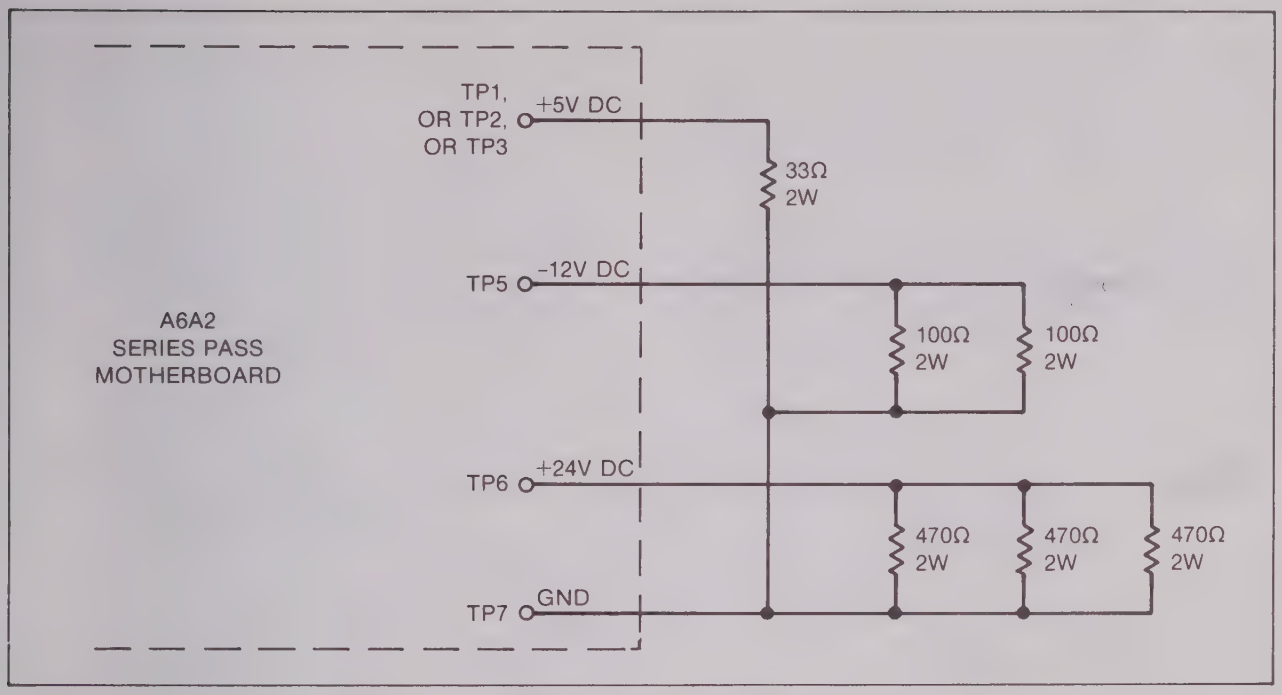


Figure 2-11. Dummy Loads

2-353. The AC line voltage is applied to J3-1 and J3-4. When the J3-1 side is positive referenced to J3-4, the ac current flows, charging capacitors, as shown by the solid arrows in Figures 2-12A and 2-12B.

2-354. When J3-4 is positive referenced to J3-1, the AC current flows as shown by the dotted lines in Figures 2-12A and 2-12B.

2-355. Diode CR2 absorbs voltage transients on the AC line and protects other components from overstress or damage. E101 is connected across the AC line when the line voltage selector is set to 115V position. This circuit assures positive fuse blowing if the instrument is accidentially connected to 230V AC line power. Components L1, L2, R3, R4, R5 and C5 form a filter that reduces conducted emissions.

2-356. A5A1 POWER SUPPLY PCB CIRCUIT ANALYSIS

2-357. The DC voltage at J1-1, J1-3, and J1-6 is applied to transistors Q1 and Q2 on the A5A1 PCB through a common mode noise filter which consists of capacitors C1, C2, and C3, and inductor L1. The voltage waveform between test point TP3 and the collector of switching transistor Q2 is depicted in Figure 2-13.

2-358. Refer to Figure 2-13. At time t1, transistor Q1 is turned on, connecting transformer T3 across capacitor C4. At time t2, Q1 is turned off and no voltage is applied to T3. At time t3, Q2 is turned on, connecting T3 across capacitor C5. At time t4, transistor Q2 is turned off, removing VC5 from transformer T3.

2-359. Refer to Figure 2-14, Output Circuit of Switching Transistors Q1 and Q2. Capacitor C6 is a DC blocking capacitor which will prevent tranformer T3 from becoming saturated when an unbalance of turn-on time exists in switching transistors Q1 and Q2. Transformer T4 is a current sense transformer which monitors the primary urrent of transformer T3. The output of transformer T4 is full-wave rectified by diodes CR6 and CR15, and is sent to the overload protection circuit on A5A2 Regulator PCB. A static shield is provided for Q1 and Q2 in order to reduce conducted emission to the chassis.

2-360. Figure 2-15 illustrates turn-off waveforms to the switching power transistor Q1. At time t0, the pulse width modulator is disabled, and no signal appears at the secondary side of transformer T1. At time t1, the pulsewidth modulator output (= V in) goes down to approximately zero volts. At this time the base voltage of Q1 becomes positive in respect to the emitter drawing base-emitter current. This turns on Q1. At the same time, current flows through C8, CR2, and R6, charging C8. At t2, the pulse width modulator output, which is an open collector, turns off letting Vin swing up to approximately twice +12 Volts. This will turn off Q1; however, due to the stored charge in C8, turn offtime is relatively slow. This meands Q1 will consume some power during the falltime. In order to reduce the power loss, Q3, C8, R5, and CR2 are provided. The moment the pulse width modulator

switch is off at t2, the base of Q3 becomes positively biased, discharging the stored charge at the base of Q1. (Indicated by IB2 in Figure 2-15). If Q1 fails, shorting its collector to base and opening the emitter, diodes CR16, CR17, and CR18, provides protection for the components placed across the base/emitter circuit of Q1.

2-361. The voltage waveform shown in Figure 2-16 appears at the secondary side of transformer T3 and is full-wave rectified by CR7 through CR14. The LC filters, L3/C12, L5/C15, L7/C16, L8/C17 suppress ripple. Inductors L4, L6, and L9 are common mode noise chokes. The RC networks, R23/C22, R24/C23, R17/C19 and R18/C10 are snubbers which reduce voltage spikes across the full-wave rectifiers. Rectifier diodes CR7 through Cr12, and CR14 are chassis mounted. The pulse width modulator regulation signal is taken from the output of the +6V DC rectifier and is sent to the A5A2 Regulator PCB via J6 pin 1. The +6V, ±13V, and +25V outputs are available at J7 and pass through feed-through capacitors to the A5A6 Power Supply Capacitor PCB located under the cover on the rear of the instrument between the heat sink and the fan.

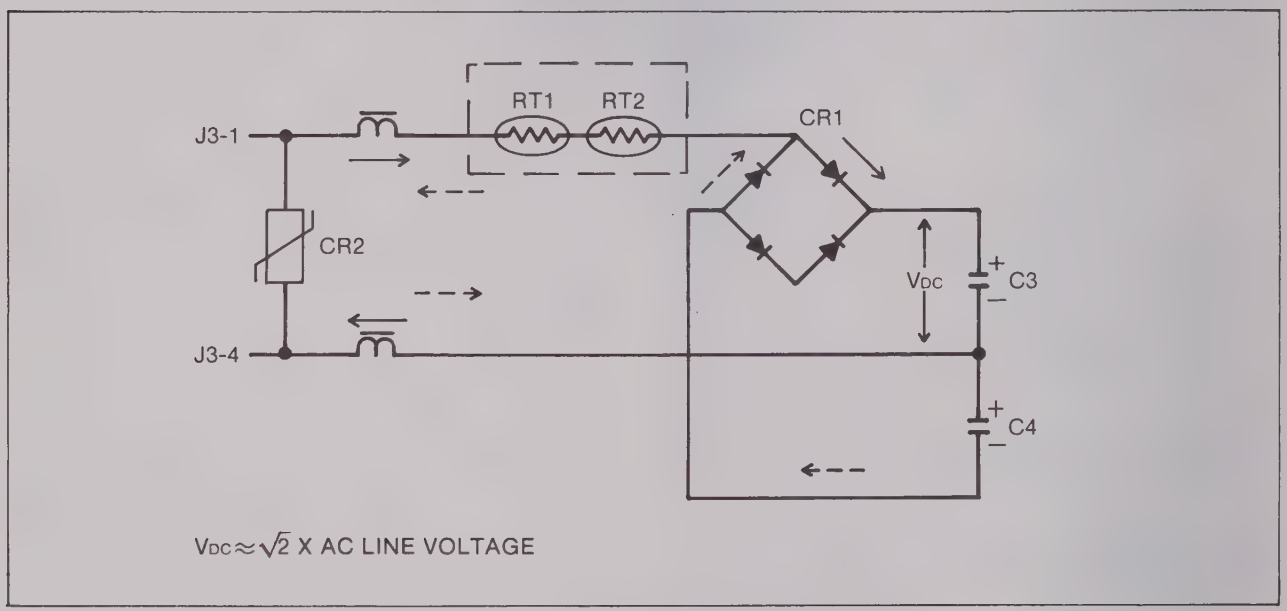


Figure 2-12A. AC Line Voltage Selector Set to 115V

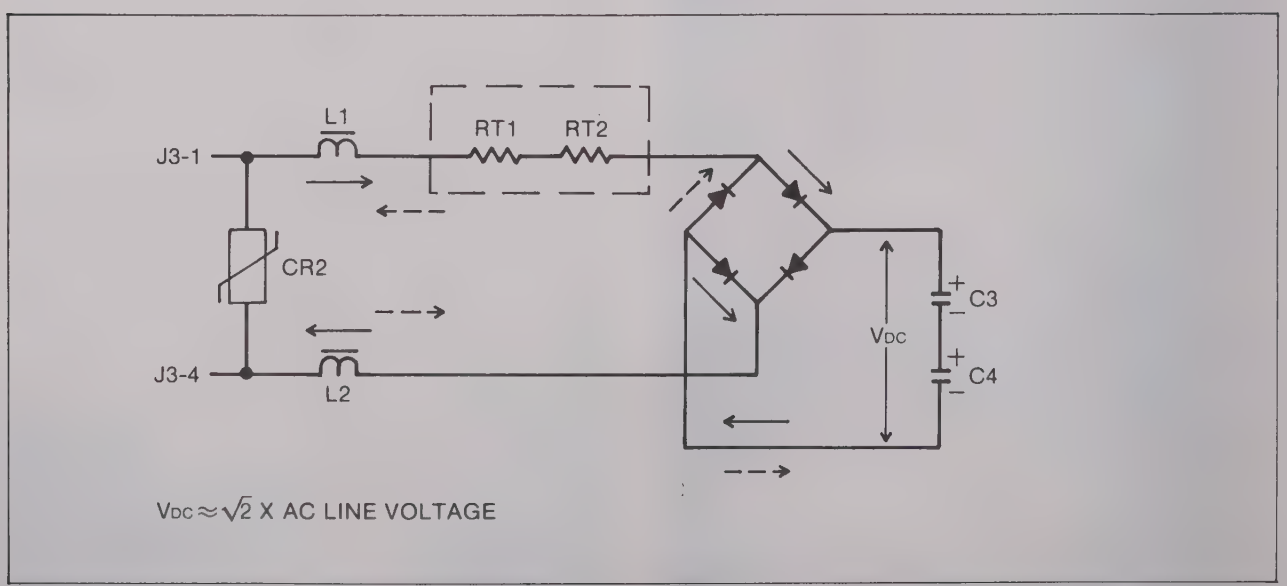


Figure 2-12B. AC Line Voltage Selector Set to 230V

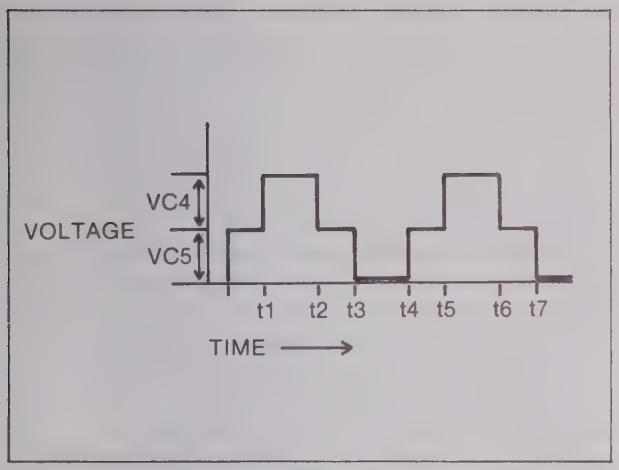


Figure 2-13. Voltage Waveform Between TP3 and Collector of Q2

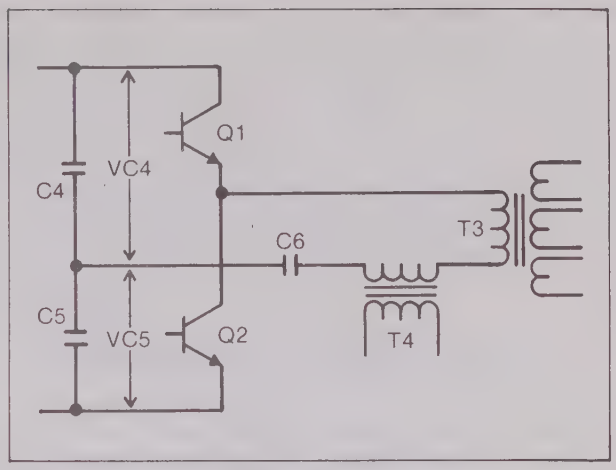


Figure 2-14. Output Circuit of Switching Transistors Q1 and Q2

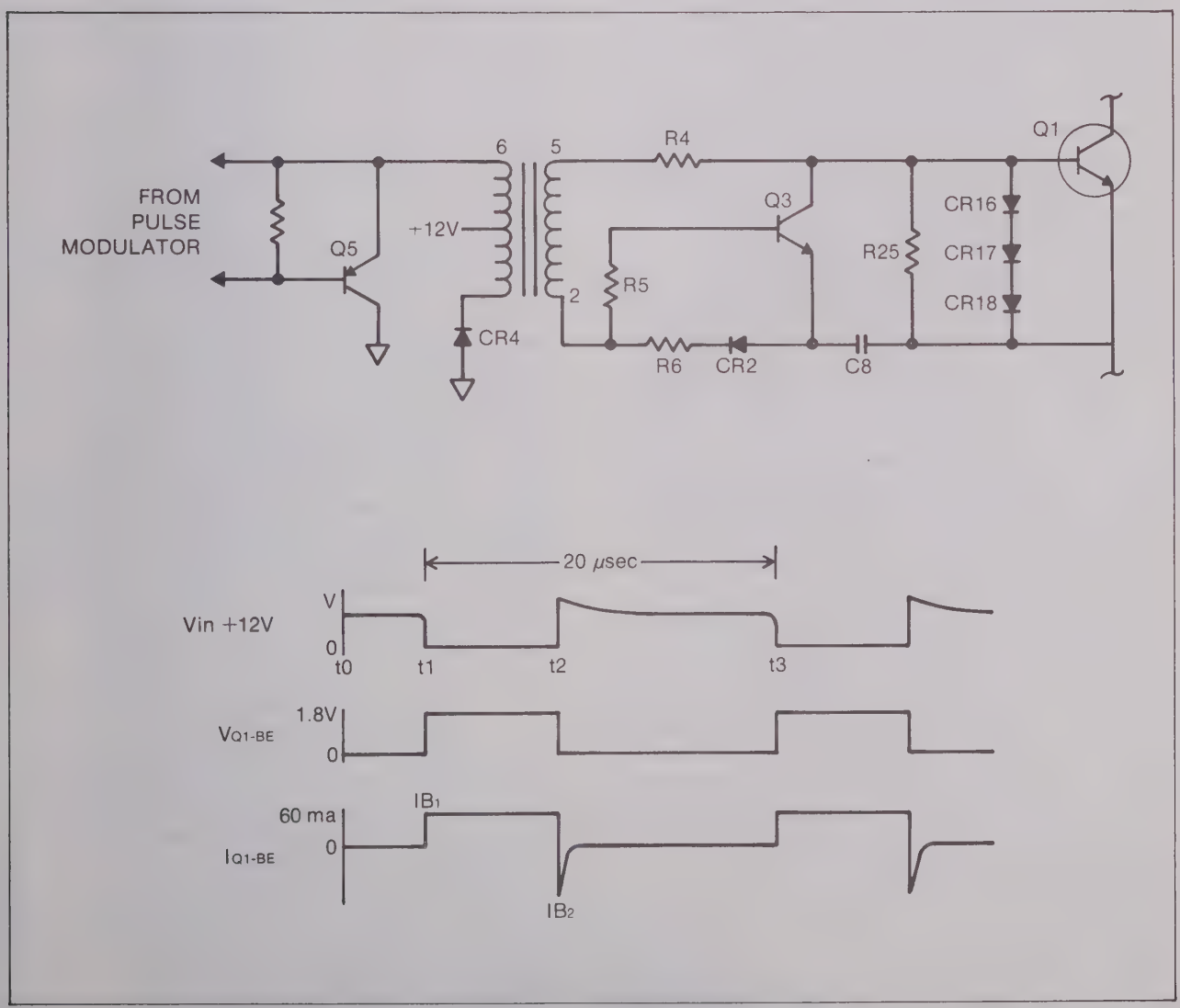


Figure 2-15. Switching Power Transistor Waveforms

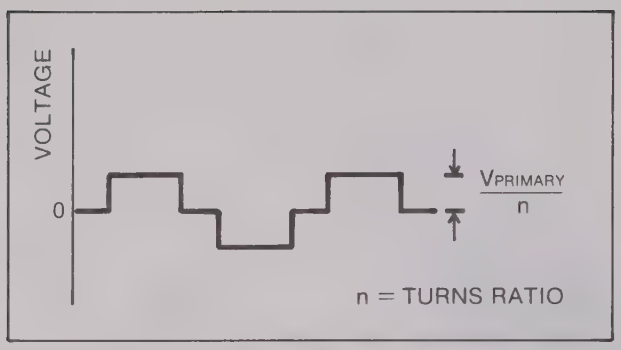


Figure 2-16. Voltage Waveform, Secondary of Transformer T3

2-362. A5A2 REGULATOR PCB CIRCUIT ANALYSIS

2-363. Refer to the Power Supply Schematic in the Schematic Manual. The +6V pwm regulation signal from the A5A1 PCB enters at E6. Inductors L2 through L6 and capacitors C9 through C13 form a ripple rejection filter. The signal is applied to the error amplifier U2 through a filter network. The reference voltage applied to the minus side of error amplifier U2 is set by R7 which adjusts the output voltage of the +6V DC switching power supply line. The output of error amplifier U2 controls the pulse width of pulse width modulator U1. When the voltage of the +6V DC line goes higher, the output at U2-6 follows, causing the pulse width at U1 pin-13 and U1 pin-11 to be narrower. This causes the voltage waveform at T3 on the A5A1 Power Supply to be narrower, resulting in lower DC output, thus regulating the output voltage. Potentiometer R1 (with Capacitor C4) determines the frequency of switching signal U1 pins-11 and -13 and is normally set to 20 μs or 50 kHz. A reference voltage is provided to pulse width modulator U1 pin 7 to maintain dead time. The dead time prevents the switching transistors (Q1, Q2 on A5A5) from conducting simultaneously, thereby preventing the transistors from being damaged.

2-364. Components Q1, Q2, U3, and U4 form an overload protection circuit. The output of the current sense transformer T4 on the A5A1 Power Supply PCB is present at J4-6. This level is monitored by voltage comparator U4. If the voltage level at U4 pin 2 exceeds +3.33 volts (nominal), the voltage at U4 pin-7 goes up toward +12V DC bringing up pulse width modulator U1 pin-6. At the same time, one-shot, U3(A), is fired which brings down ENABLE, U1 pin-15,disabling the pulse width modulator U1 output. Also, U3(A) turns on Q1 discharging C16. While pulse width modulator U1 is disabled by U3(A), U3(B) resets U4 output by turning on Q2, setting the protection circuits ready for the next cycle. Approximately two seconds later from the beginning of the protection trigger at U4, outputs of U3(A) return to the initial state, (pin 6 to low and pin 7 to high), turning off Q1. Then capacitor C16 is being charged through R25, and the voltage at U1 pin 6 will gradually drop, enabling pulse width modulator to increase the pulse width. This is called soft start. If overload still exists, the protection circuit cycles again. When the overload no longer exists, the power supply resumes normal operations.

2-365. A5A3 AUXILIARY TRANSFORMER PCB CIRCUIT ANALYSIS

2-366. Refer to the Power Supply Schematic in the Schematic Manual. Negative temperature coefficient thermistors RT1 and RT2 reduce the surge current when the main switch on the rear panel is turned on. When the switching power supply is running, thermistors RT1 and RT2 are shorted out by relay K1 which is energized by +5V DC from the series pass regulator.

2-367. When the AC line voltage selector switch is set to 115V, two primary windings of transformer T1 are connected in parallel. When the voltage selector switch is set to 230V, the two primary windings are connected in series. The secondary winding is bridge recified and filtered by diodes CR2 through CR5 and capacitor C2. Transistor Q1, and diodes CR6 and CR7 form a +24V DC regulator that provides power to the oven oscillator when it is installed. Resistors R4, R5, and transistor Q2 provide current limiting. This +24V DC is also used to light the STDBY light on the front panel. Regulator U1 provides +13V DC (nominal) which is used to energize the A5A2 Regulator PCB During start-up of switching supply. Also this line, +12V DC, is routed to the front panel assembly through the A5A1 Power Supply PCB, A5A6 Power Supply Capacitor PCB, and the A6A2 Motherboard PCB to energize the thermal shutdown and the +5V DC power-on sense circuits.

2-368. A5A6 POWER SUPPLY CAPACITOR PCB CIRCUIT ANALYSIS

2-369. Refer to the A5A6 Power Supply Capacitor PCB Schematic in the Schematic Manual. Capacitors C1 through C5 are filter capacitors for normal mode noise. Capacitors C6, C8, and C9 are for common mode noise. Inductor L1 and Capacitor C7 are used to prevent conducted emissions from the switching supply to the output of the +5V DC series-pass regulator.

2-370. A6A2 MOTHERBOARD PCB CIRCUIT ANALYSIS

2-371. Refer to the A6A2 Motherboard PCB Schematic in the Schematic Manual. All the pre-regulated DC lines, nominally +6V, ±13V, and +25V are distributed to the appropriate series-pass regulators which plug into the motherboard. The regulated outputs, +5V, ±12V, +24, are distributed to the appropriate output terminals, J4 through J7. Inductor L1 and capacitor C7 suppress noise generated by the fan from being conducted back to the +13V line. The +24 volt supply to the oven oscillator is derived from the switching supply when the instrument is on, and from theauxiliary power supply when in STDBY.

For overload protection, all of the output voltages of the series-pass regulators are monitored through J6 pin 13 by Q1 and Q2 and associated components (Figure 2-17, below). When the output voltages are normal, nominally zero voltage appears at the base of Q2 and the emitter of Q1, keeping Q1 and Q2 turned off. If any one of the series-pass regulators is shorted to ground, either Q1 or Q2 will become active, drawing current out of the ON/STDBY line. This causes the output of pulse width modulator U1 on A5A2 Regulator PCB to narrow, reducing the output voltages from the switching power supply.

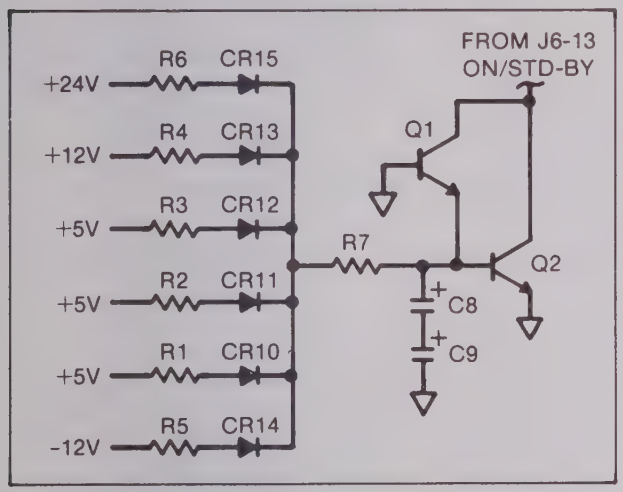


Figure 2-17. Overload Protection, Simplified Schematic

2-372. A6A4 +24V, +12V, -12V SERIES-PASS REGULATOR PCB CIRCUIT ANALYSIS

2-373. Refer to the A6A4 Series Pass Regulator PCB Schematic in the Schematic Manual. The +25 volts from the switching power supply is applied to Q5. The output from Q5, +24V, is monitored by U3 through a voltage divider R4, R5, and R6. Zener diode CR1 provides the reference 6.4V DC to the error amplifier U3. Capacitor C4 reduces noise generated by the zener diode. Resistor R19 provides a base current pass for Q5 at the time of turn-on. The output voltages of this regulator is adjusted by R5 to 24V. The +24V is used as the reference voltage from the +12V regulator whose output voltage is determined by R11 and R12. The -12V regulator output is used as the reference voltage for the -12V regulator whose output is determined by R16 and R17. Thus the output voltages of all of the series-pass regulators is set by R5. The power-up sequence of the outputs from the regulators is +24V, +12V, and -12V.

2-374. A6A3 +5V SERIES-PASS REGULATOR PCB CIRCUIT ANALYSIS

2-375. There are three +5V regulators on the A6A3 Series-Pass Regulator PCB. The +5V SYNTH supplies +5V to the Synthesizer Plate, the +5V OUTPUT supplies +5V to Output Plate, and +5V DIG supplies +5V to Front Panel Assembly.

2-376. Reference voltage to each regulator is derived from the +12V regulator output. Output voltages are determined by voltage dividers, R3 and R4, R7 and R8, and R11 and R12. Output voltage sensing is done within this board. Therefore, the voltage divider resistors are chosen such that all the regulator output voltages are slightly higher than +5V in order to compensate for voltage drops in the following passes.

2-377. A6A1 IEEE CONNECTOR PCB CIRCUIT ANALYSIS

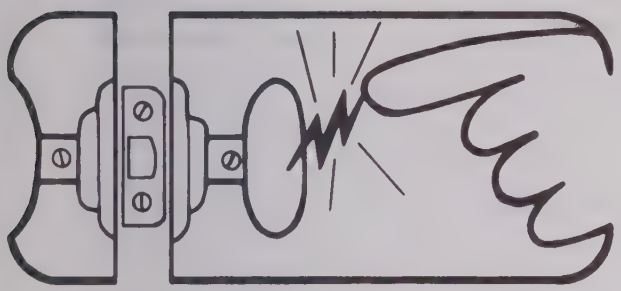
2-378. The A6A1 IEEE Connector PCB contains the standard 24-pin female IEEE-488 cable connector and the IEEE-488 address switch. Refer to the System Block Diagram and the A6A1 IEEE Schematic in the 6070A/6071A Schematic Manual.

2-379. The printed circuit board is located on the rear panel under the fan assembly. The toggle switches determines the IEEE-488 address of the instrument. The A6A1 IEEE Connector PCB is connected to the A2A4 Controller Motherboard by cable W4.

static awareness

A Message From

John Fluke Mfg. Co., Inc.

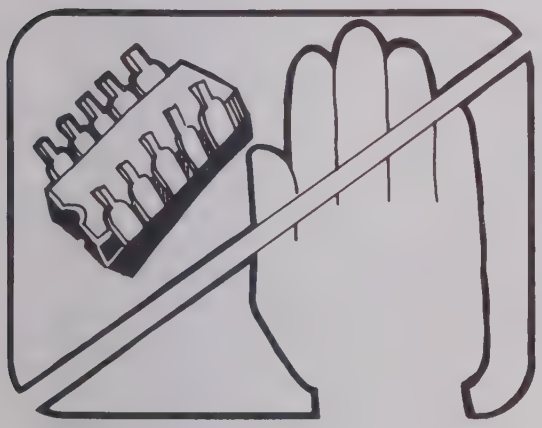


Some semiconductors and custom IC's can be damaged by electrostatic discharge during handling. This notice explains how you can minimize the chances of destroying such devices by:

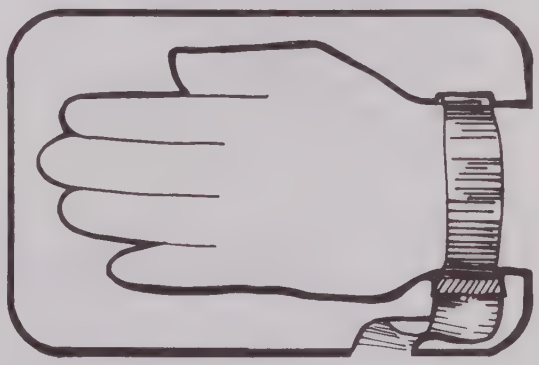
1. Knowing that there is a problem.
2. Learning the guidelines for handling them.
3. Using the procedures, and packaging and bench techniques that are recommended.

The Static Sensitive (S.S.) devices are identified in the Fluke technical manual parts list with the symbol "⊗"

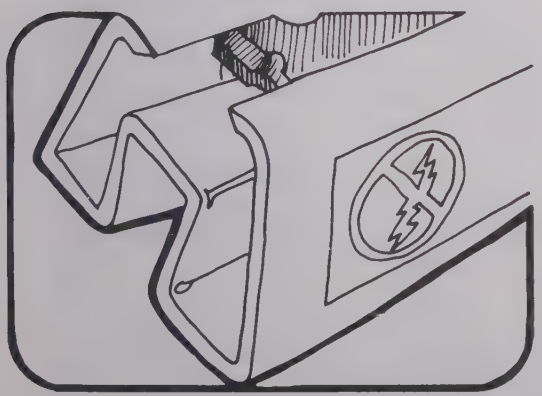
The following practices should be followed to minimize damage to S.S. devices.



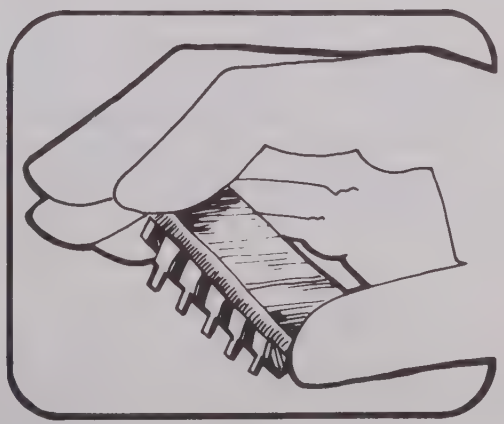
1. MINIMIZE HANDLING



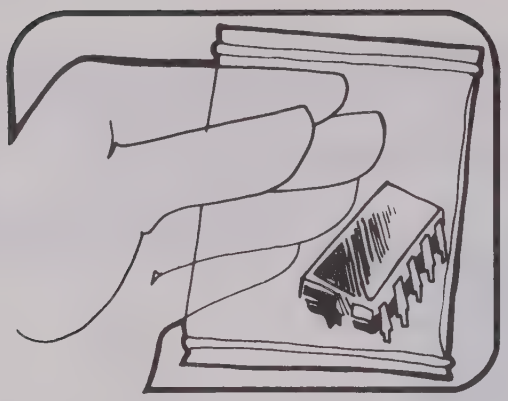
3. DISCHARGE PERSONAL STATIC BEFORE HANDLING DEVICES



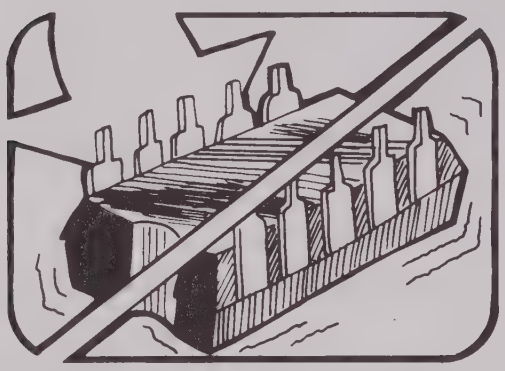
2. KEEP PARTS IN ORIGINAL CONTAINERS UNTIL READY FOR USE.



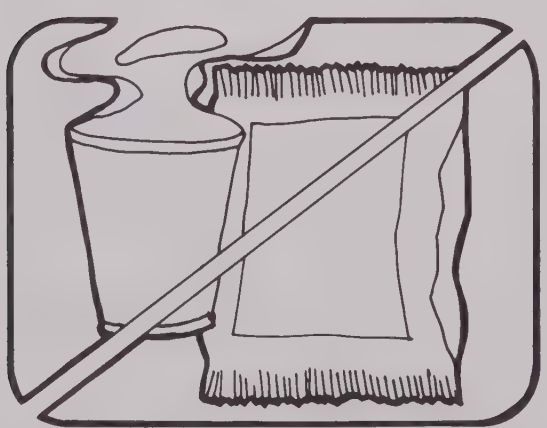
4. HANDLE S.S. DEVICES BY THE BODY



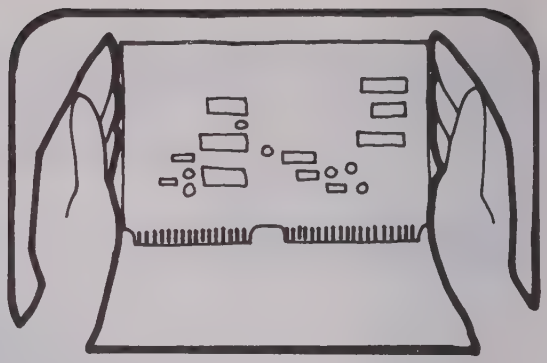
5. USE ANTI-STATIC CONTAINERS FOR HANDLING AND TRANSPORT



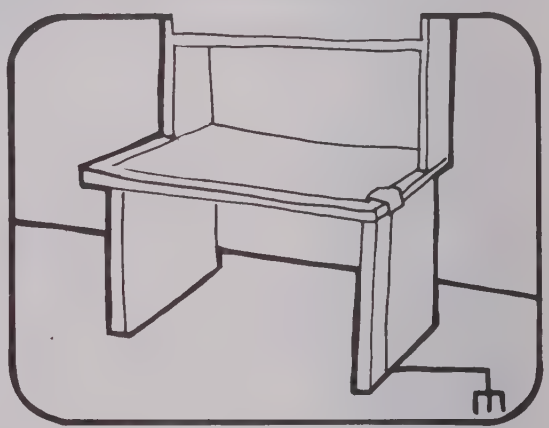
6. DO NOT SLIDE S.S. DEVICES OVER ANY SURFACE



7. AVOID PLASTIC, VINYL AND STYROFOAM® IN WORK AREA



8. WHEN REMOVING PLUG-IN ASSEMBLIES, HANDLE ONLY BY NON-CONDUCTIVE EDGES AND NEVER TOUCH OPEN EDGE CONNECTOR EXCEPT AT STATIC-FREE WORK STATION. PLACING SHORTING STRIPS ON EDGE CONNECTOR USUALLY PROVIDES COMPLETE PROTECTION TO INSTALLED SS DEVICES.



9. HANDLE S.S. DEVICES ONLY AT A STATIC-FREE WORK STATION
10. ONLY ANTI-STATIC TYPE SOLDER-SUCKERS SHOULD BE USED.
11. ONLY GROUNDED TIP SOLDERING IRONS SHOULD BE USED.

Anti-static bags, for storing S.S. devices or pcbs with these devices on them, can be ordered from the John Fluke Mfg. Co., Inc.. See section 5 in any Fluke technical manual for ordering instructions. Use the following part numbers when ordering these special bags.

John Fluke Part No.	Description
453522	6" X 8" Bag
453530	8" X 12" Bag
453548	16" X 24" Bag
454025	12" X 15" Bag
Pink Poly Sheet 30"x60"x60 Mil P/N RC-AS-1200 $20.00	Wrist Strap P/N TL6-60 $7.00

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Section 3
Access Procedure

3-1. INTRODUCTION

3-2. The information in this section describes instrument access procedures. Each access procedure is composed of a disassembly procedure and a corresponding assembly procedure. Table 3-1 is the Access Procedure Index.

3-3. LOCATION OF MAJOR ASSEMBLIES

3-4. The locations of the major assemblies of the 6070A/6071A are illustrated in Figure 3-1. The synchronizer module and the output module swing out from the center cable assembly. Circuit boards are located on each side of the synchronizer module and output module. Figures 3-2 and 3-3 illustrate the circuit board locations for the synchronizer module, and Figures 3-4 and 3-5 illustrate the circuit board locations for the output module. The 6070A and 6071A can be energized for maintenance purposes when opened up as shown in Figure 3-1.

3-5. INTERIOR ACCESS PROCEDURE

3-6. Introduction

3-7. The Interior Access Procedure allows access to the interior of the instrument. This procedure is basic to every other access procedure. Since the following disassembly and assembly procedures are simple, they are not illustrated.

3-8. Disassembly Procedure

3-9. Remove the top and bottom covers to gain access to the interior of the instrument. Use the following procedures:

1. Remove the five screws along the front edge and the five screws along the rear edge of each cover.

2. Lift the covers off the instrument.

3-10. Assembly Procedure

3-11. Assemble the instrument by installing the top and bottom covers using the following procedure:

1. Slide the covers back onto the instrument. Make sure that the cover slots are toward the front of the instrument. Make sure that the edge of each cover side fits onto the slots in the side rails of the instrument.

2. Fasten the covers in place using the screws removed during thedisassembly procedure.

3-12. A3A3 AND A3A5 PRINTED CIRCUIT BOARDS ACCESS PROCEDURE

3-13. Introduction

3-14. The A3A3 Delay Discriminator PCB and the A3A5 VCO PCB access procedure consists of removing the module cover. After the module cover has been removed, the cover screws must be properly torqued to insure specified RF integrity. Figure 3-6 illustrates the sequence in which the screws must be torqued.

3-15. Disassembly Procedure

3-16. Complete the following procedure to gain access to the A3A3 and A3A5 printed circuit boards.

1. Set the front panel POWER control and the rear panel MAIN POWER switch to the OFF positions, and remove line power from the instrument.

2. Complete the disassembly portion of the Interior Access Procedure.

3. Remove the 13 screws and flat washers that hold the A3A3 Delay Discriminator and A3A5 VCO cover in place.

Table 3-1. Access Procedure Index

EQUIPMENT DESCRIPTION	PARAGRAPH REFERENCE	EQUIPMENT LOCATION	FIGURE REFERENCE
A1A1 Front Panel PCB	3-82	Front Panel Assembly	3-9, 3-15
A2A1 Controller PCB and A2A4 Controller PCB	3-89	Controller Assembly	3-9, 3-16
A3A2 10 MHz Reference PCB	3-10	Top of Synthesizer Module	3-2
A3A3 Delay Discriminator PCB	3-12	Top of Synthesizer Module	3-2
A3A4 N/1 Divider PCB	3-19	Top of Synthesizer Module	3-2
A3A9 Synthesizer Distribution PCB	3-19	Top of Synthesizer Module	3-2
A3A5 VCO PCB	3-12	Top of Synthesizer Module	3-2
A3A1 Phase Detector PCB	3-26	Bottom of Synthesizer Module	3-1, 3-3
A3A7 Sub-Synthesizer PCB	3-26	Bottom of Synthesizer Module	3-1, 3-3
A3A6 SSB Mixer PCB	3-26	Bottom of Synthesizer Module	3-1, 3-3
A3A8 Synthesizer Control Buffer PCB	3-26	Bottom of Synthesizer Module	3-1, 3-3
A3A10 VCO PCB	3-26	Bottom of Synthesizer Module	3-1, 3-3
A4A2 Mod Oscillator PCB	3-33	Bottom of Output Module	3-1, 3-5
A4A3 Attenuator PCB	3-40	Top of Output Module	3-4
A4A4 Modulator/Divider PCB	3-47	Top of Output Module	3-1, 3-4
A4A6 Output Amplifier PCB (X2 Output Ampl)	3-33	Bottom of Output Module	3-5
A4A7 Output Amplifier PCB	3-33	Bottom of Output Module	3-5
A4A8 Heterodyne Oscillator PCB	3-47	Top of Output Module	3-1, 3-4
A4A9 Heterodyne Converter PCB	3-33	Bottom of Output Module	3-1, 3-5
A4A10 Mod Distribution PCB	3-33	Bottom of Output Module	3-1, 3-5
A5A1 Power Supply PCB	3-54	Power Supply Assembly	3-9
A5A2 Auxiliary Power Supply PCB	3-54	Power Supply Assembly	3-9
A5A3 Auxiliary Transformer	3-54	Power Supply Assembly	3-9
A5A4 Input Rectifier PCB	3-54	Power Supply Assembly	3-9
A5A5 Switching Transistors PCB	3-54	Power Supply Assembly	3-9
A5A6 Power Supply Capacitors PCB	3-54	Power Supply Assembly	3-9
A6A1 IEEE Connector PCB	3-96	Rear Panel	3-9, 3-17

Table 3-1. Access Procedure Index (cont)

EQUIPMENT DESCRIPTION	PARAGRAPH REFERENCE	EQUIPMENT LOCATION	FIGURE REFERENCE
A6A2 Series-Pass Motherboard PCB	3-54	Power Supply Assembly	3-9
A6A3 +5 Volt Series-Pass Voltage Regulator PCB	3-54	Power Supply Assembly	3-9
A6A4 +12V, -12V, +24V, Series-Pass Voltage Regulator PCB	3-54	Power Supply Assembly	3-9
A7 Delay Cable Assembly	3-61	Delay Cable Assembly	3-11
A1/A2 Encoder Assembly	3-75	Front Panel/Controller Assembly	3-15
A1/A2 Front Panel/Controller Assembly	3-68	Front Panel/Controller Assembly	3-9

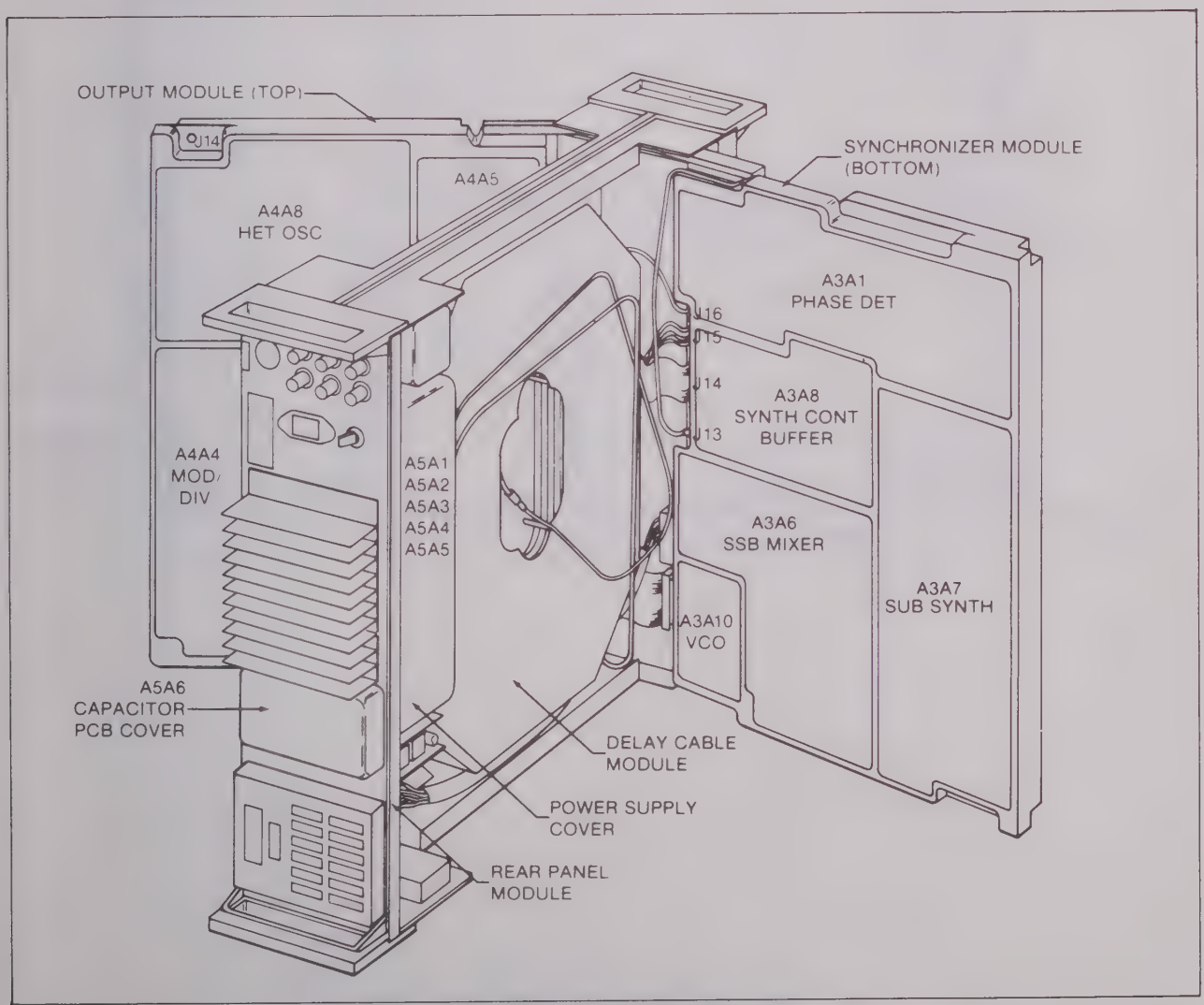

Figure 3-1. 6070A/6071A Opened for Maintenance

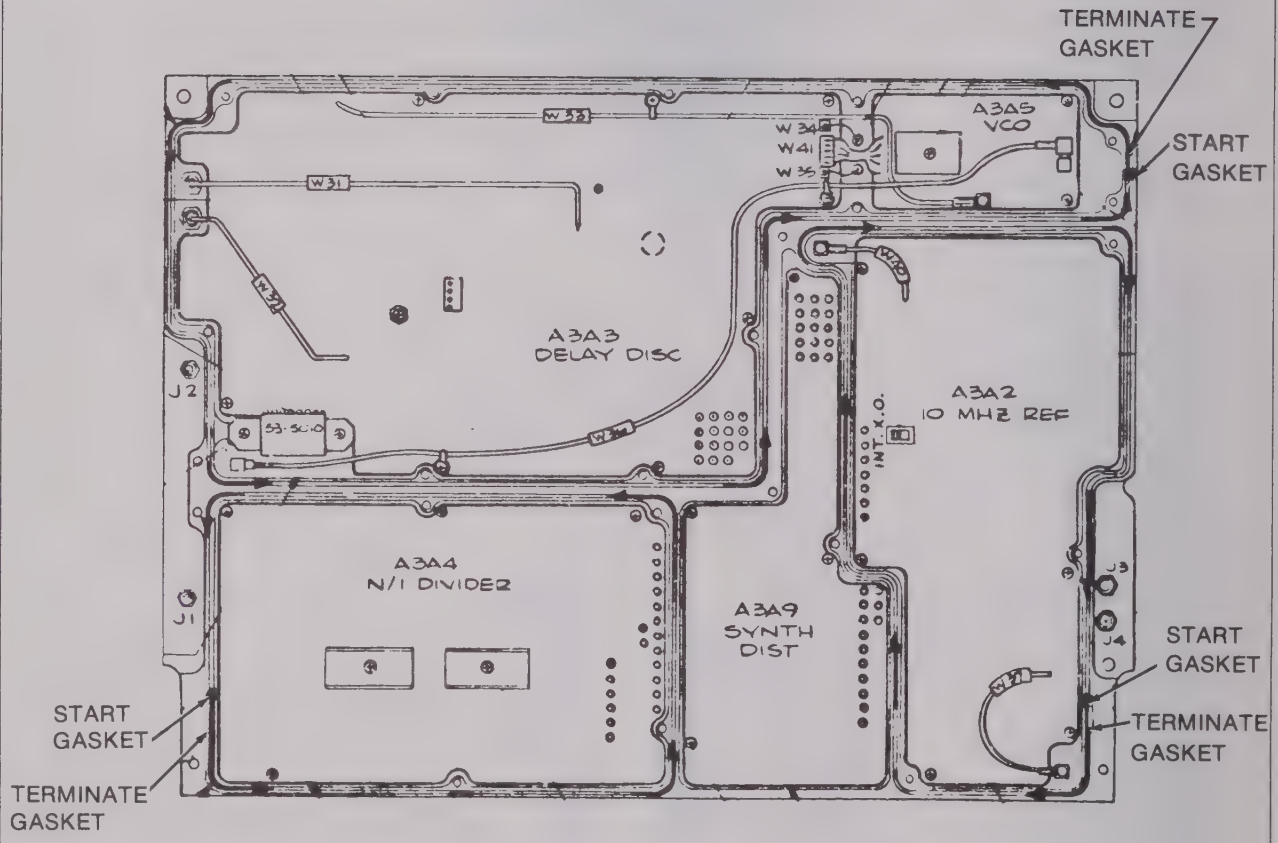

Figure 3-2. Top Synthesizer Module

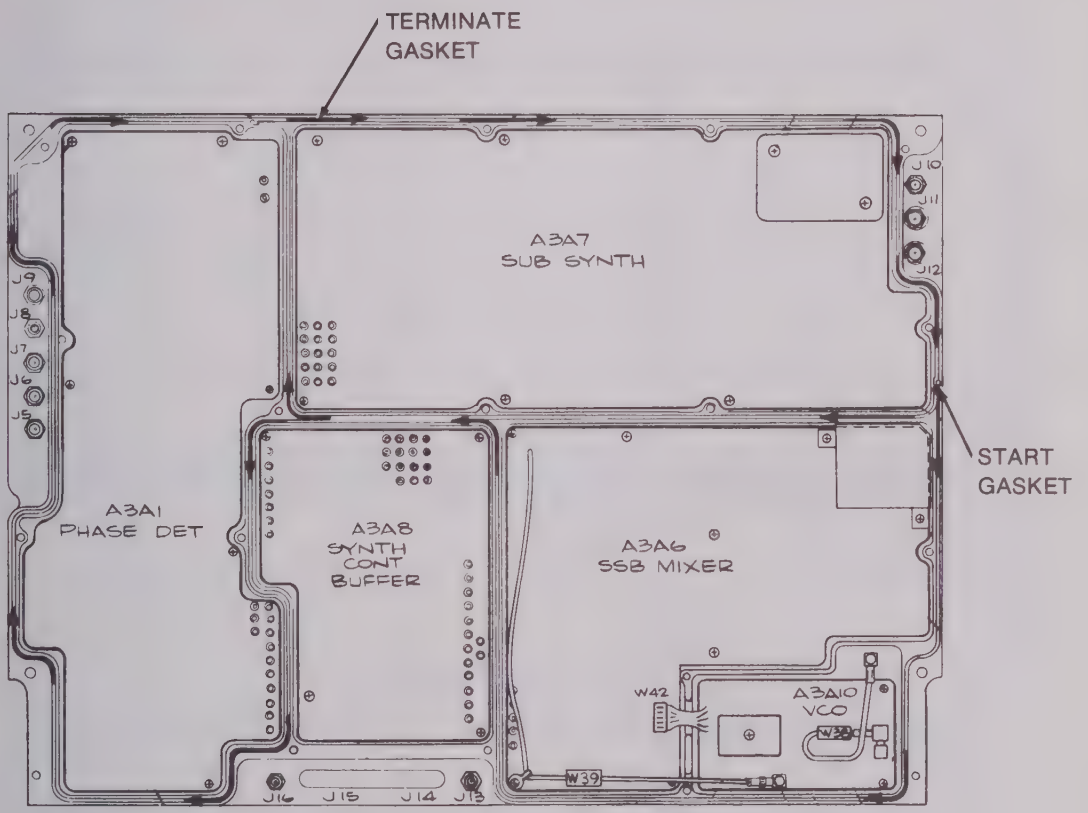

Figure 3-3. Bottom of Synthesizer Module

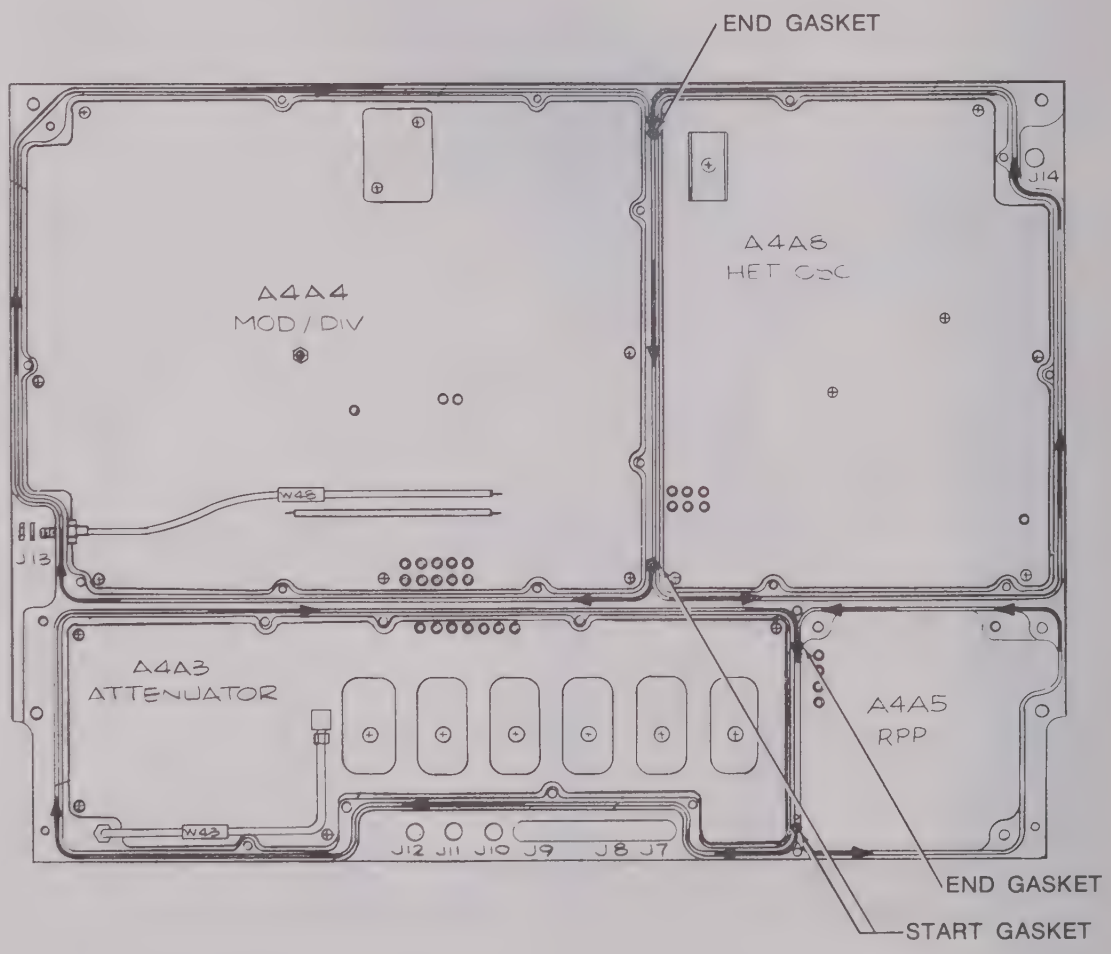

Figure 3-4. Top of Output Module

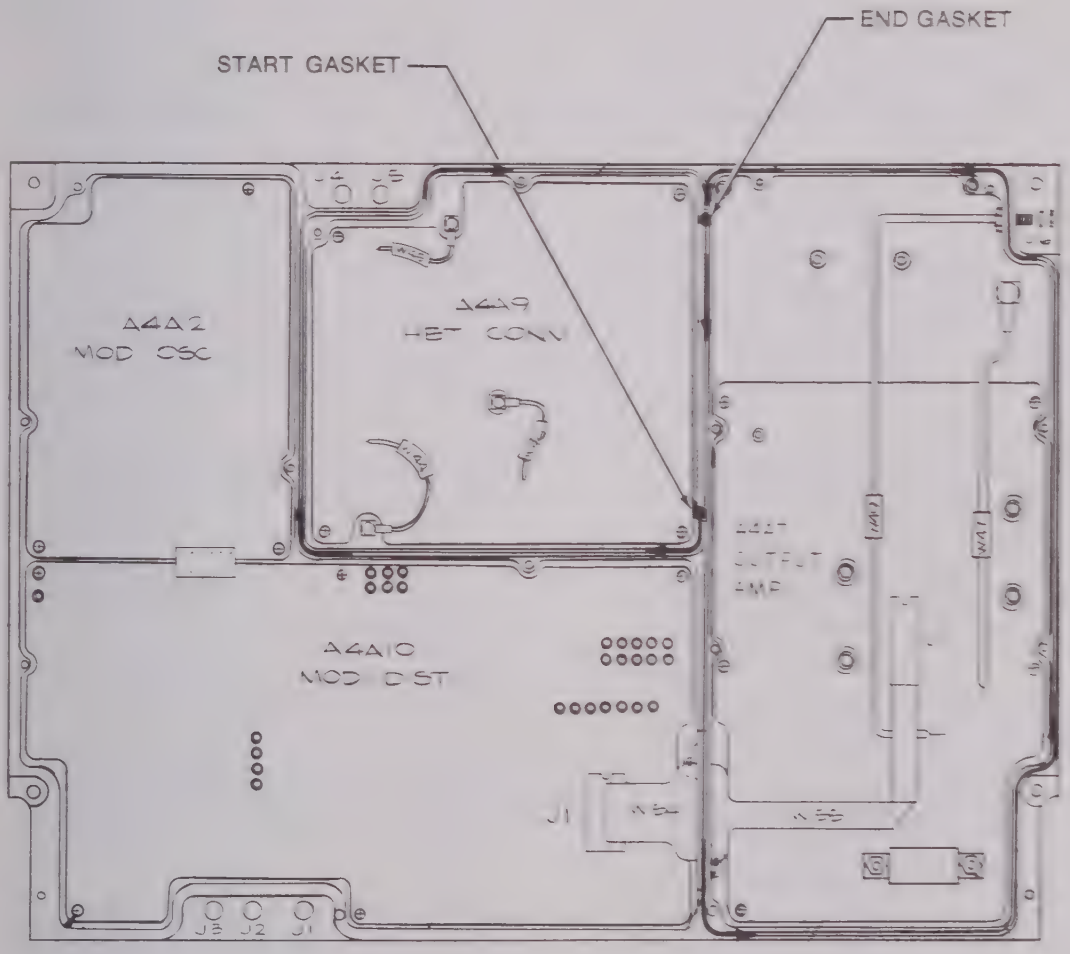

Figure 3-5. Bottom of Output Module

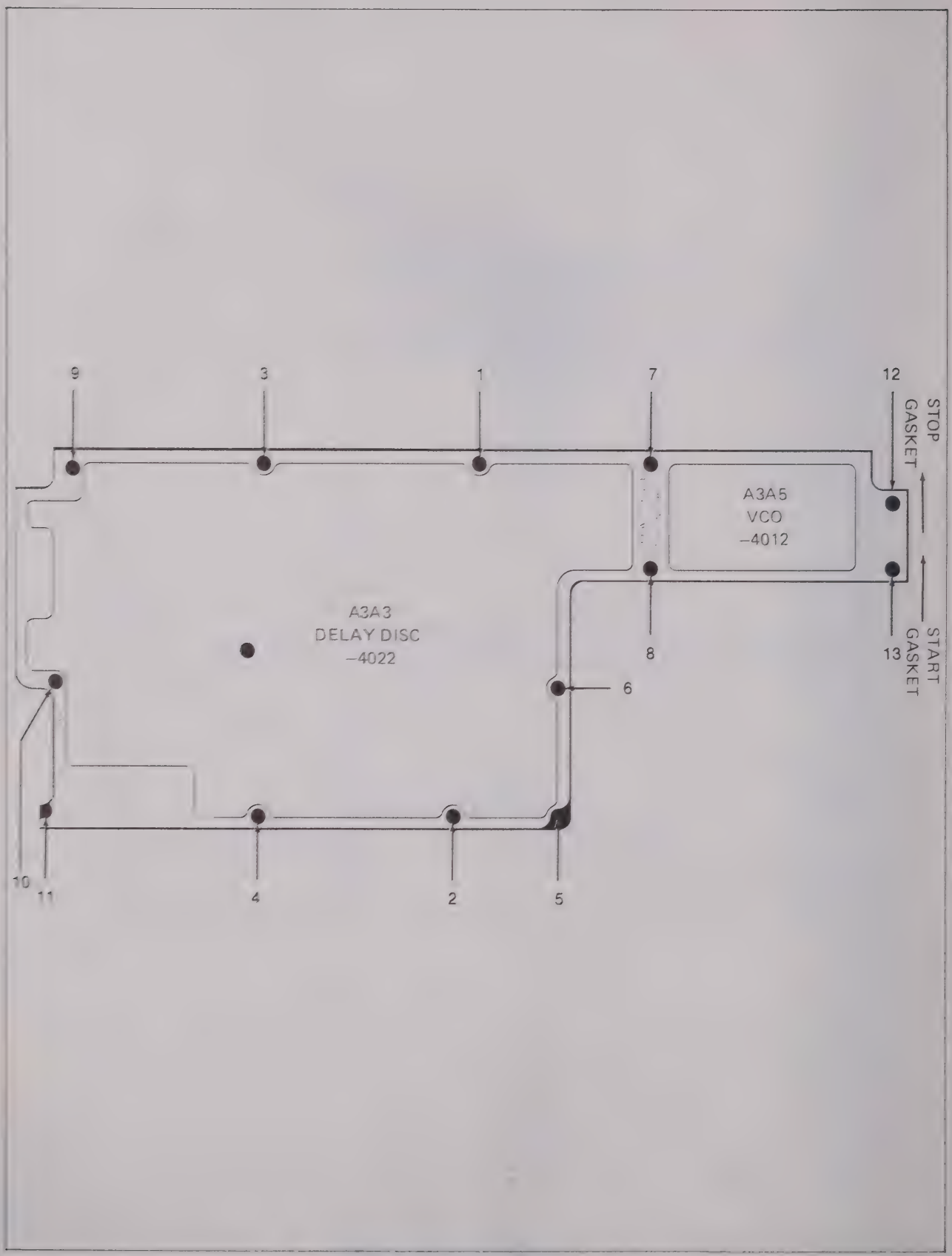

Figure 3-6. Torque Sequence, A3A3, A3A5 Cover

4. Carefully lift the cover off; do not disturb the RF gaskets under the cover.

3-17. Assembly Procedure

3-18. Complete the following procedure to assemble the instrument:

1. Make sure that the RF gasket is in place. The gasket should start and end as shown in Figure 3-2. Inspect the RF gaskets for damage (areas that are folded over, worn, or pinched).

2. If the RF gasket folls out, use the following steps to properly install it:

a. Start the RF gasket at screw number 13 (Figures 3-2 and 3-6).

b. Traveling counterclockwise, press the gasket into the groove.

c. The end of the gasket must continue past the beginning of the gasket (at screw 13) to screw 12 (Figure 3-6).

3. Lower the cover carefully and start the 13 screws through the washers. Do not tighten any of the screws.

4. A torque screwdriver is recommended to tighten all the screws. Use thefollowing procedure:

a. Torque all the screws to 3 inch-pounds in the numerical sequence shown in Figure 3-6.

b. Torque all the screws to 7 to 9 inch-pounds in the numerical sequence shown in Figure 3-6. The torque value should be the same for all screws.

3-19. A3A2, A3A4, AND A3A9 PRINTED CIRCUIT BOARDS ACCESS PROCEDURE

3-20. Introduction

3-21. The A3A2 10 MHz Reference PCB, the A3A4 N/1 Divider PCB, and the A3A9 Synthesizer Distribution PCB access procedure consists of removing the top cover. After the top cover has been removed, the cover screws must be torqued back in place to insure specified RF integrity. Figure 3-7 illustrates the sequence in which the screws must be torqued.

3-22. Disassembly Procedure

3-23. Complete the following procedure to gain access to the A3A2, A3A4, and the A3A9 printed circuit boards.

1. Set the front panel POWER control and the rear panel MAIN POWER switch to OFF positions and remove line power from the instrument.

2. Complete the disassembly portion of the Interior Access Procedure.

3. Remove the 12 screws and flat washers that hold the A3A2, A3A4, and A3A9 cover in place.

3-24. Assembly Procedure

3-25. Complete the following procedure to assemble the instrument:

1. Make sure the RF gaskets are in place. The gaskets must start and end as shown in Figure 3-2. Inspect the RF gaskets for damage (areas that are folded over, worn, or pinched).

2. If the RF gaskets fall out, replace them as shown in Figure 3-2.

a. Insert the gasket around A3A2 in clockwise direction and press it into the groove.

b. Insert the gasket around A3A4 in counterclockwise direction and press it into the groove.

c. The end of the gasket must continue past (overlap) the beginning of the gasket as shown in Figure 3-2.

3. Lower the cover carefully and start the 12 screws through the washers. Do not tighten any of the screws.

4. Use the electric torque screwdriver to tighten all the screws. Use the following procedure:

a. Torque all the screws to 3 inch-pounds in the numerical sequence shown in Figure 3-7.

b. Torque all the screws to 7 to 9 inch-pounds in the numerical sequence shown in Figure 3-7. The torque value should be the same for all screws.

3-26. A3A1,A3A6,A3A7,A3A8 AND A3A10 PRINTED CIRCUIT BOARDS ACCESS PROCEDURE

CAUTION

To prevent damage to the coaxial cables and connectors, observe the following cautions when handling the cables or connectors.

1. Do not bend the cables.

2. Do not place excessive strain between the cables and connectors.

3. Start SMA connectors carefully, keep the connector straight with respect to the jack.

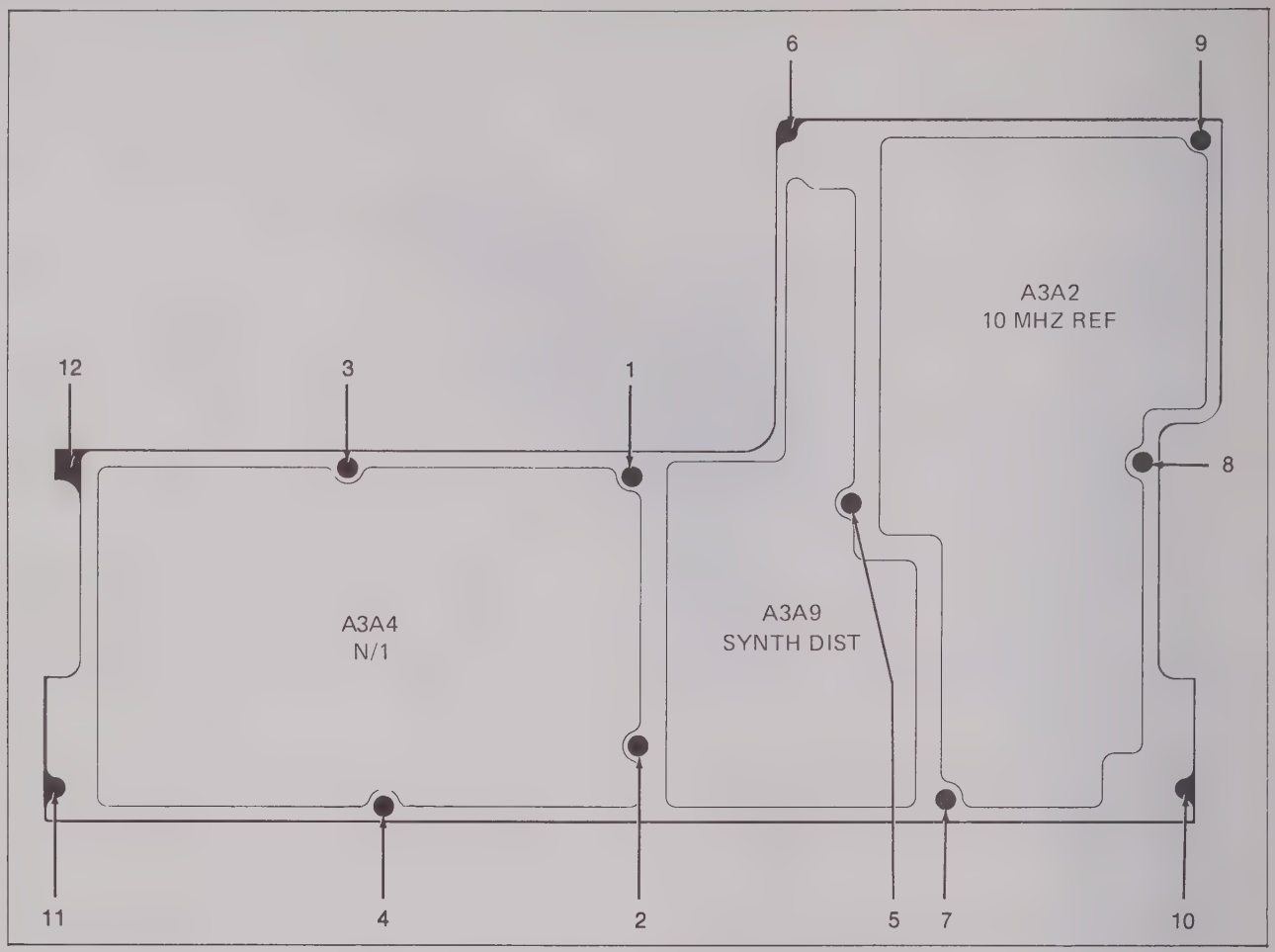

Figure 3-7. Torque Sequence, A3A2, A3A4, A3A9 Cover

3-27. Introduction

3-28. The A3A1 Phase Detector PCB, A3A6 SSB Mixer PCB, A3A7 Sub-Synthesizer PCB, A3A8 Synthesizer Control Buffer PCB, and the A3A10 VCO PCB are located in the bottom of the Synthesizer Module (Figures 3-1 and 3-3). The access procedure allows access to the printed circuit boards for troubleshooting procedures. After the cover has been removed, the cover screws must be torqued back in place to insure specific RF integrity. Figures 3-3, 3-8, 3-9, and 3-10 illustrate the disassembly and assembly procedures.

3-29. Disassembly Procedure

3-30. Complete the following procedure to gain access to the A3A1, A3A6, A3A7, A3A8, and A3A10 printed circuit boards.

1. Set the front panel POWER control and the rear panel MAIN POWER switch to the OFF position and remove line power from the instrument.

2. Complete the disassembly portion of the interior access procedure.

3. Swing the Synthesizer Module out using the followingprocedure:

   a. Refer to Figure 3-8 and disconnect J3, J5, J6, J7, J8, J9, J10, J11, and J12.

   b. Remove the four screws and washers (H1 and H2) and two screws (H3) shown in Figure 3-9.

4. Remove the 19 screws and washers that hold the lower cover of the Synthesizer Module in place (Figure 3-10).

5. Carefully remove the cover so that the RF gaskets under the cover are not disturbed.

6. If the instrument is to be operated (as in the procedures described in troubleshooting), jumper cables from the 6070A/6071A service kit must be installed between some of the connectors and the connections that have been disconnected.

3-31. Assembly Procedure

3-32. Complete the following procedure to assemble the instrument.

1. Make sure that the RF gaskets are in place (Figure 3-3) and inspect the RF gaskets for damage (areas that are folded over, worn, or pinched).

2. If any RF gasket falls out, use the following steps to properly install it:

   a. Start the Rf gasket at the appropriate START GASKET point shown in Figure 3-3.

   b. Traveling in the direction indicated in Figure 3-3, press the gasket into the groove.

   c. The end of the gasket should be at the TERMINATE GASKET point shown in Figure 3-3.

3. Lower the cover carefully and start the 19 screws through the washers. Do not tighten any of the screws.

4. Use on electric torque screw driver to tighten all the screws. Use the following procedure:

   a. Torque all the screws to 3 inch-pounds in the numerical sequence shown in Figure 3-10.

   b. Torque all the screws to 7 to 9 inch-pounds in the numerical sequence shown in Figure 3-10. The torque value should be the same for all screws.

5. Swing the synthesizer module back into place using the followingprocedure:

   a. Remove any jumper cables that may have been installed.

   b. Remove the two screws (H3) from the position B holes.

CAUTION

To avoid cable damage when swinging the Synthesizer Module back in place, make sure that the cables between the synthesizer plate and the Delay Line are in the positions shown in Figure 3-11.

   c. Swing the Synthesizer Module completely into position; make sure that the semirigid coaxial cables between the Synthesizer Module and the Delay Line are in the positions shown in Figure 3-11. This insures that these cables are not damaged by one of the screws in the Synthesizer Module cover or by cables being crossed over one another.

   d. Fasten the two screws (H3) into position A (Figure 3-9) and fasten the four washers and screws (H1 and H2) back in place.

   e. Refer to Figure 3-8 and connect J3, J5, J6, J7, J8, J9, and J10.

6. Complete the assembly portion of the Interior Access Procedure.

3-33. A4A2, A4A6, A4A7, A4A9, AND A4A10 PRINTED CIRCUIT BOARDS ACCESS PROCEDURE

3-34. Introduction

3-35. The A4A2 Mod Oscillator PCB, A4A6 X2 Output Amplifier PCB, A4A7 Output Amplifier PCB, A4A9 Heterodyne Converter PCB, and A4A10 Mod Distribution PCB are located in the bottom of the Output Module (Figure 3-5). The A4A7 Output Amplifier PCB is used only in the Model 6070A instruments. The A4A6 X2 Output Amplifier PCB is used only in the Model 6071A instruments. The access procedure allows access to the printed cirucit boards for troubleshooting procedures. After the cover has been removed, the cover screws must be torqued back in place to insure specific RF integrity. Figures 3-5 and 3-12 illustrate the disassembly and assembly procedures.

3-36. Disassembly Procedure

3-37. Complete the following procedure to gain access to the A4A2, A4A6, A4A7, A4A8, A4A9 and A4A10 printed circuit boards.

1. Set the front panel POWER control to STBY. Set the rear panel MAIN POWER switch to OFF. Disconnect the instrument from line power.

2. Complete the disassembly portion of the Interior Access Procedure.

3. Remove the screws and washers that hold that bottom cover of the outputmodule in place (Figure 3-12).

4. Carefully lift the cover off; do not disturb the RF gaskets under the cover.

3-38. Assembly Procedure

3-39. Complete the following procedure to assemble the instrument:

1. Make sure the RF gaskets are in place (Figure 3-5) and inspect the RF gaskets for damage (areas that are folded over, worn, or pinched).

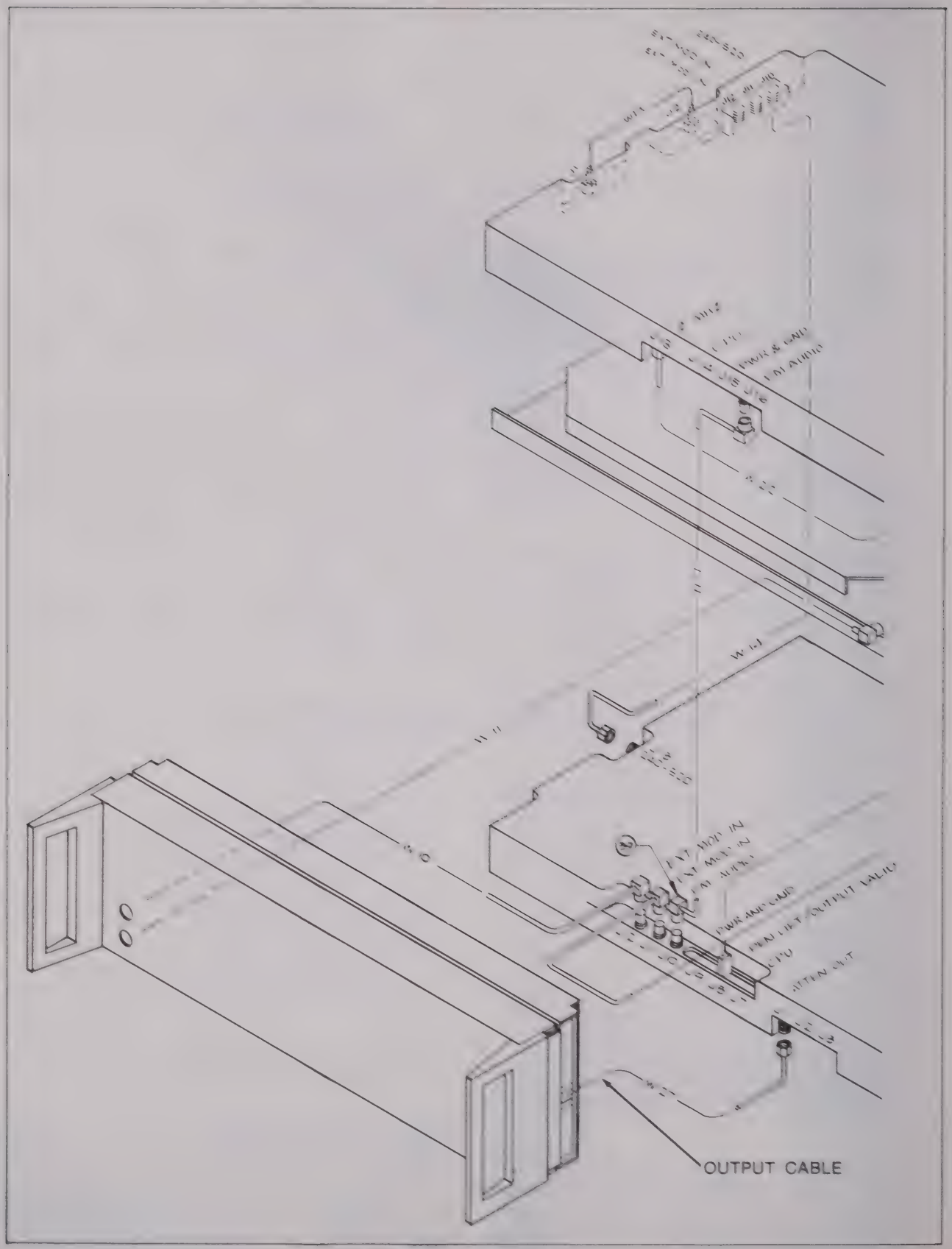

Figure 3-8. Access I

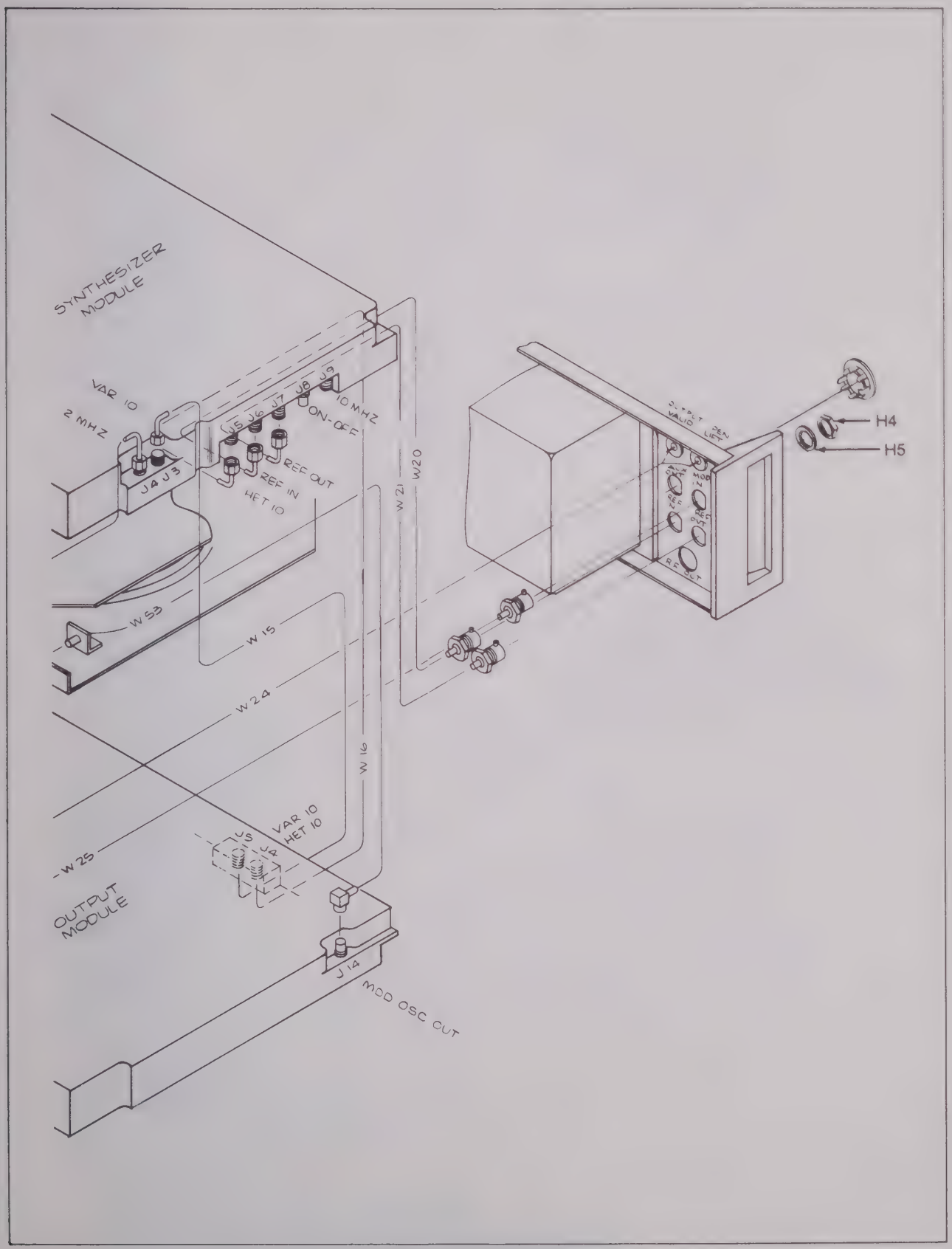

Figure 3-8. Access I (cont)

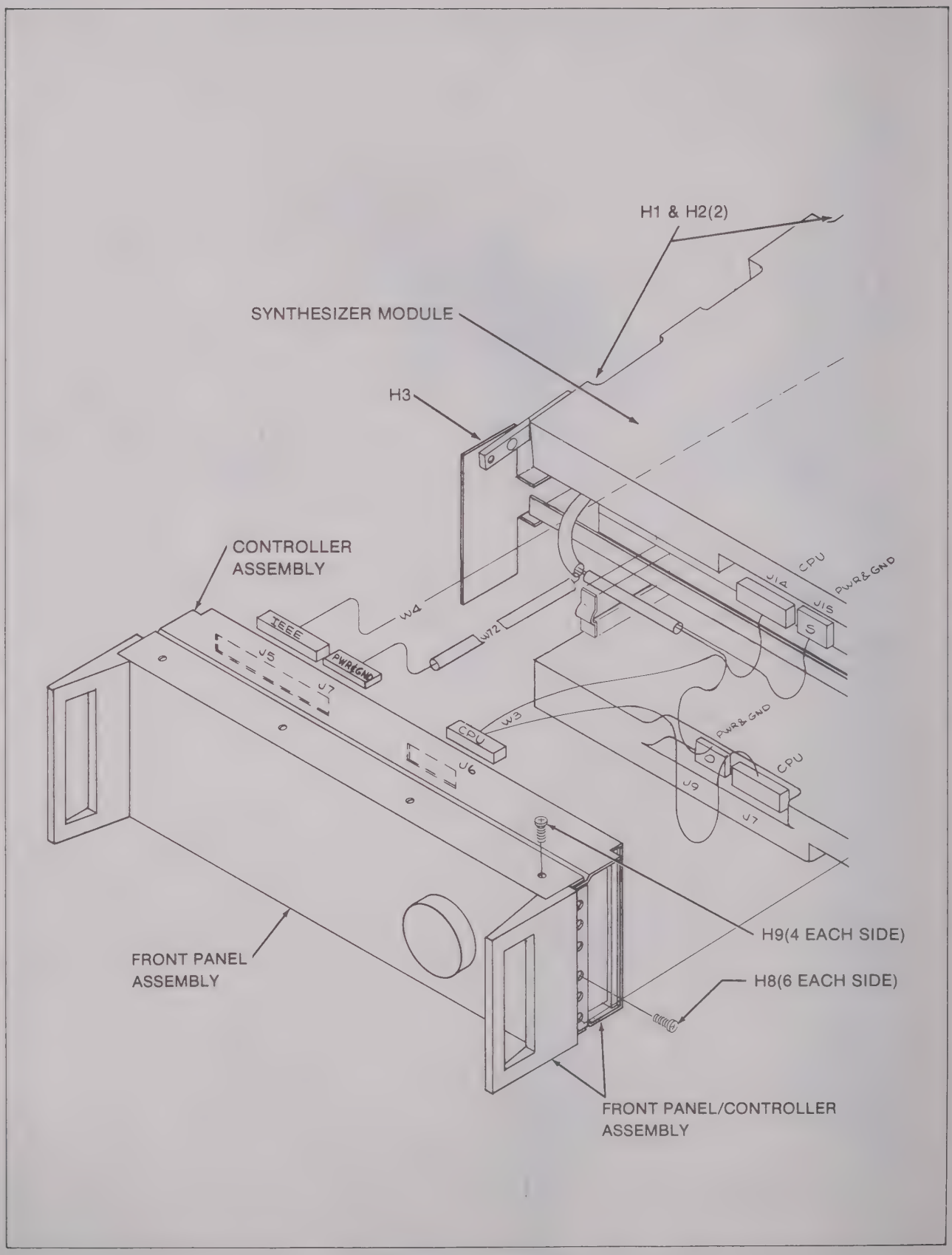

Figure 3-9. Access II

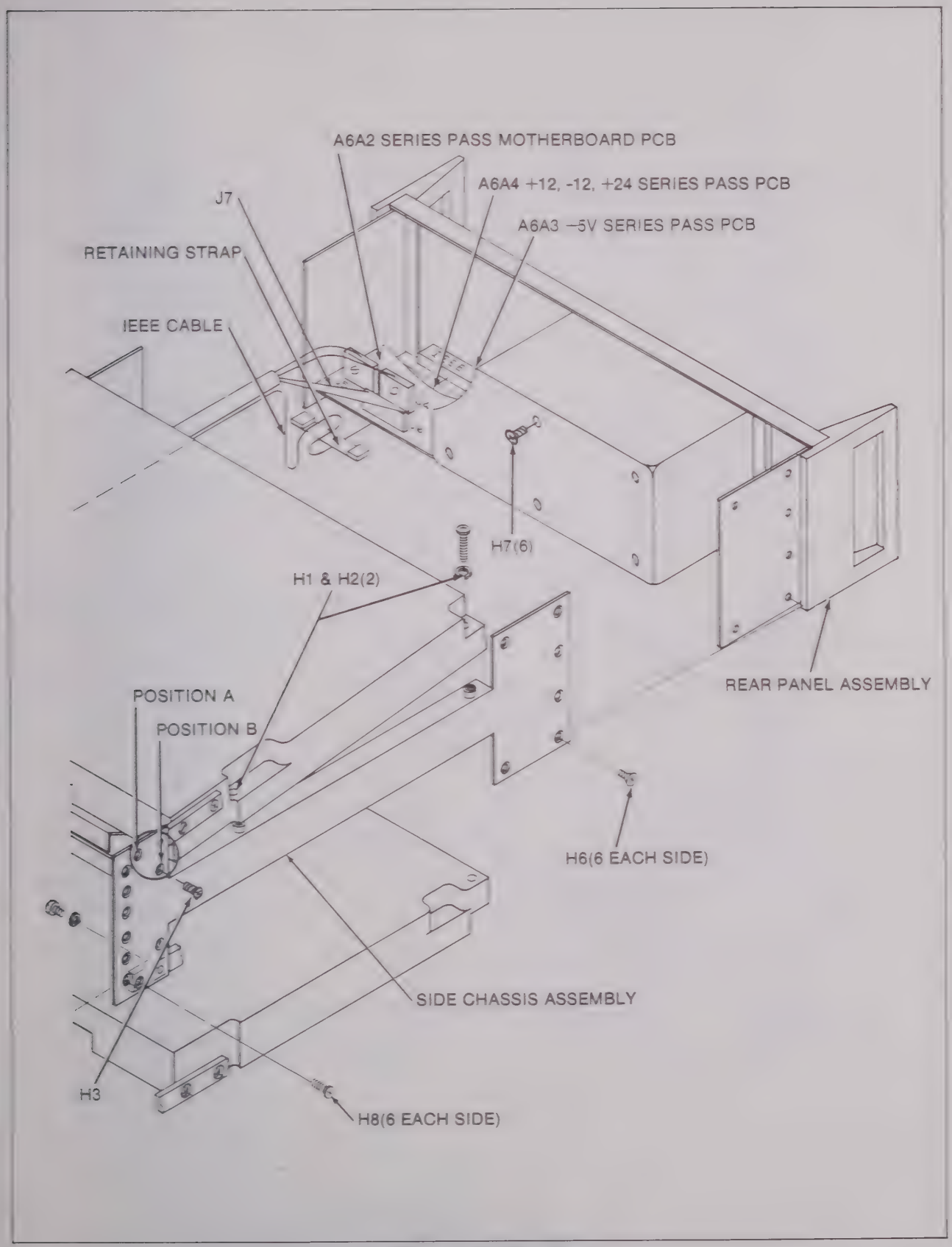

Figure 3-9. Access II (cont)

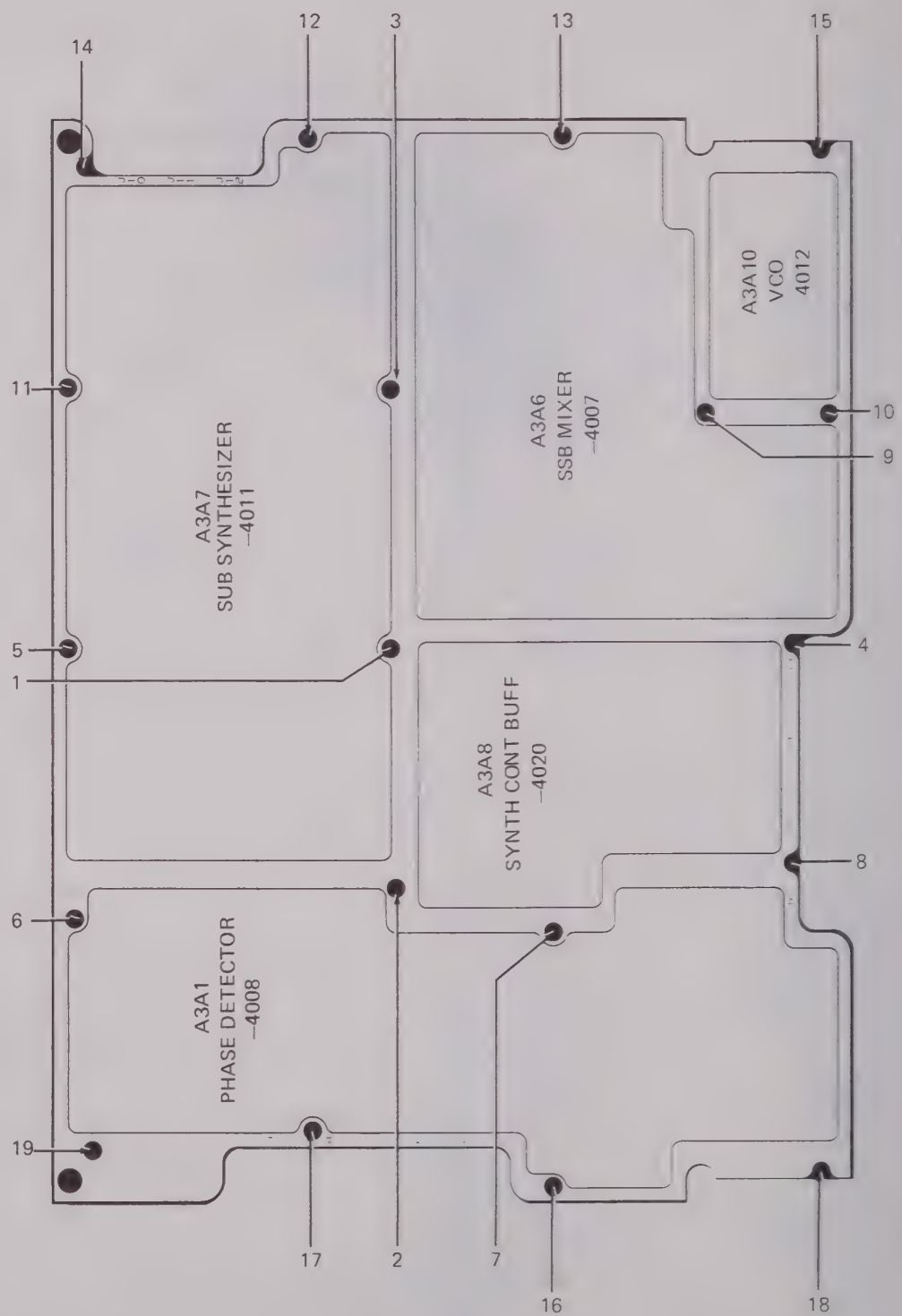

Figure 3-10. Torque Sequence, Bottom Cover of the Synthesizer Module

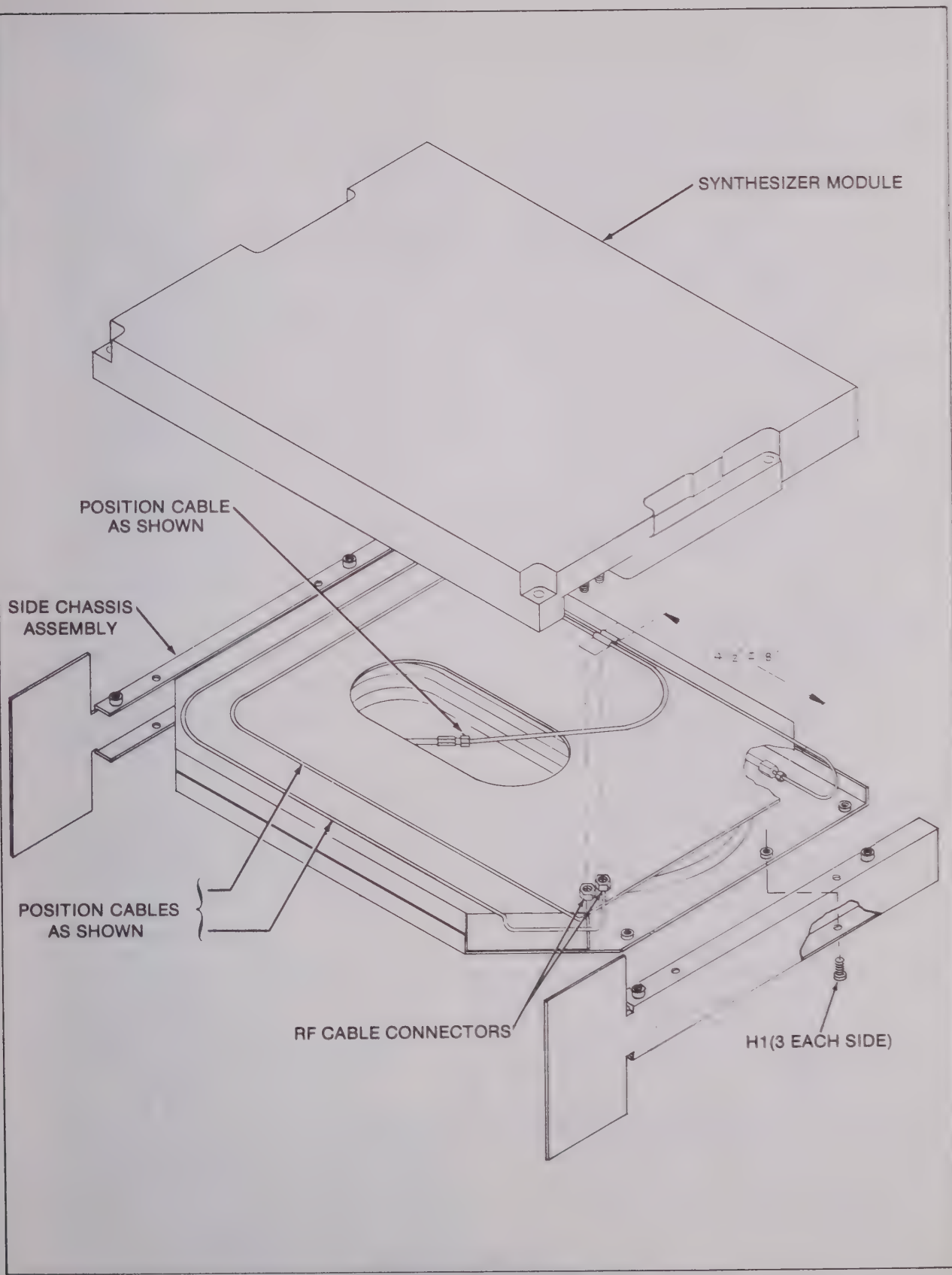

Figure 3-11. Cable Locations

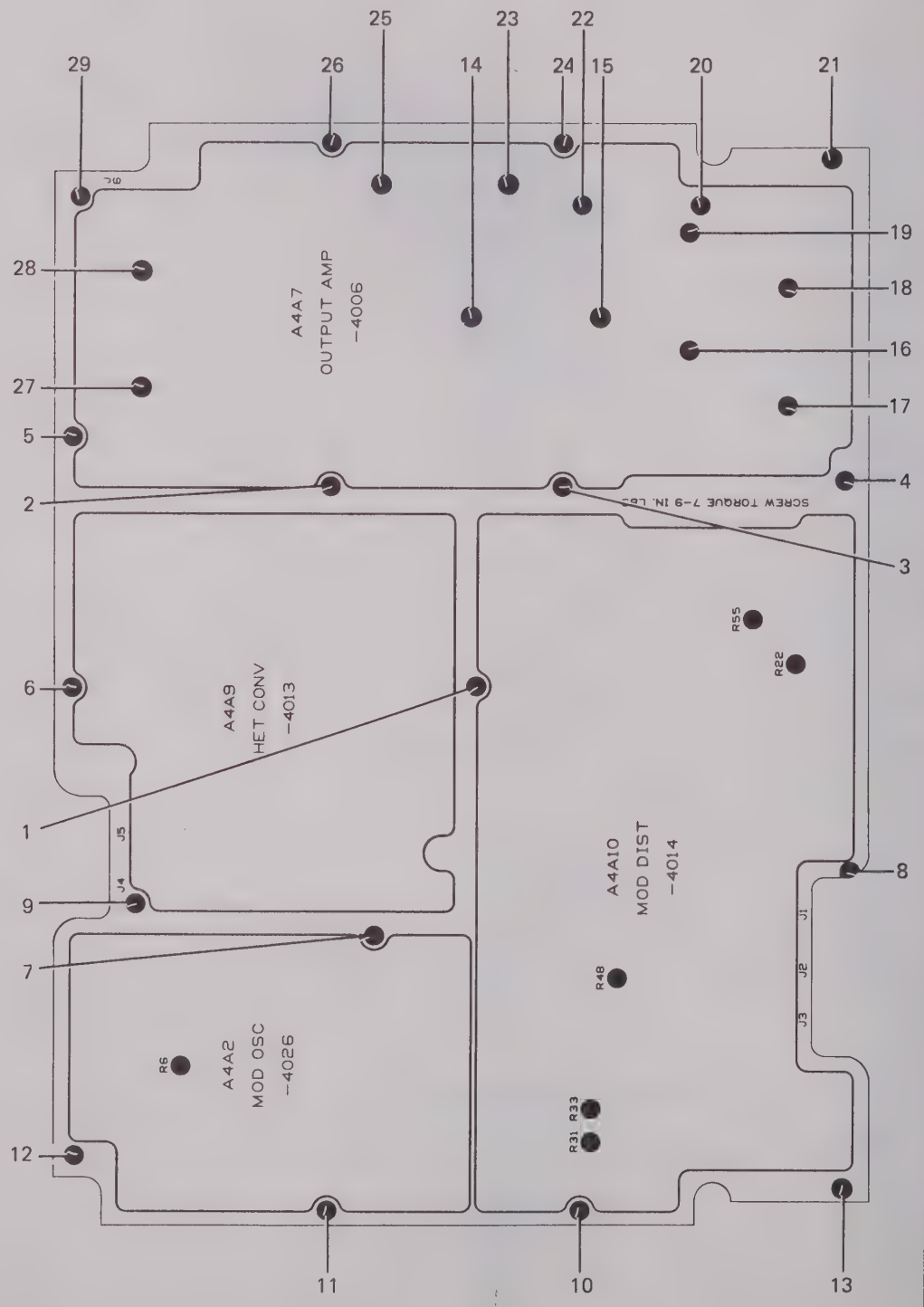

Figure 3-12. Torque Sequence, Output Module, Bottom Cover

2. If a RF gasket falls out, use the following steps to properly install it.

a. Start the gasket at the appropriate START GASKET point shown in Figure 3-5.

b. Traveling in the direction indicated, press the gasket into the groove.

c. The end of the gasket should be at the TERMINATE GASKET point shown in Figure 3-5.

3. Lower the cover carefully in place and start all the screws through the washers. Do not tighten the screws.

4. Use an electric torque screwdriver to tighten all the screws according to the following procedure:

a. Torque all screws to 3 inch-pounds in the numerical sequence shown in Figure 3-12.

b. Torque all screws to 7 to 9 inch-pounds in the numerical sequence shown in Figure 3-12. The torque value should be the same for all screws.

5. Complete the assembly portion of the Interior Access Procedure.

3-40. A3A3 PRINTED CIRCUIT BOARD ACCESS PROCEDURE

CAUTION

To prevent damage to the coaxial cables and connectors, observe the following cautions when connecting the cables and connectors.

1. Do not bend the cables.

2. Do not place excessive strain between the cables and connectors.

3. Start SMA connectors carefully; keep the connector straght with respect to the jack.

3-41. Introduction

3-42. The A3A3 Attenuator printed circuit boards are located in the top of the Output Module (Figures 3-1 and 3-4). The access procedure allows access to the printed circuit board for maintenance procedures. After the cover has been removed, the cover screws must be torqued back in place to insure specific RF integrity. Figures 3-4, 3-8, 3-9, and 3-13 illustrate the disassembly and assembly procedures.

3-43. Disassembly Procedure

3-44. Complete the following procedure to gain access to the A4A3 Attenuator PCB.

1. Set the front panel POWER control to STBY. Set the rear panel MAIN POWER control to OFF. Remove line power from the instrument.

2. Complete the disassembly portion of the interior access procedure.

3. Complete the following steps to swing out the Output Module:

a. Refer to Figure 3-8 and disconnect J1, J4, J5, J13, and J14.

b. Remove the four screws and washers (H1 and H2) and the two screws (H3) shown in Figure 3-9.

c. Lift the Output Module until J10, J11, and J12 can be reached. Disconnect J10, J11, and J12.

d. Swing the module out 90 degrees and lock it in this position by installing the two screws (H3) in position B (Figure 3-9). Remove the A4A3 and A4A5 cover screws (Figure 3-13).

4. Carefully lift the cover off; do not disturb the RF gasket under the cover.

5. If the instrument is to be operated (for troubleshooting procedures) jumper cables from the 6070A/6071A Service Kit must be installed. For maintenance procedures install two jumper cables: one from A4AJ5 to A3AJ3 and one from A4AJ13 to A3AJ10.

3-45. Assembly Procedure

3-46. Complete the following procedure to assemble the instrument:

1. Remove the jumper cables that have been installed.

2. Make sure the RF gaskets are in place (Figure 3-4) and inspect the RF gaskets for damage (areas that are folded over, worn, or pinched).

3. If a RF gasket falls out, use the following steps to properly install it:

a. Start the gasket at the START GASKET point shown in Figure 3-4.

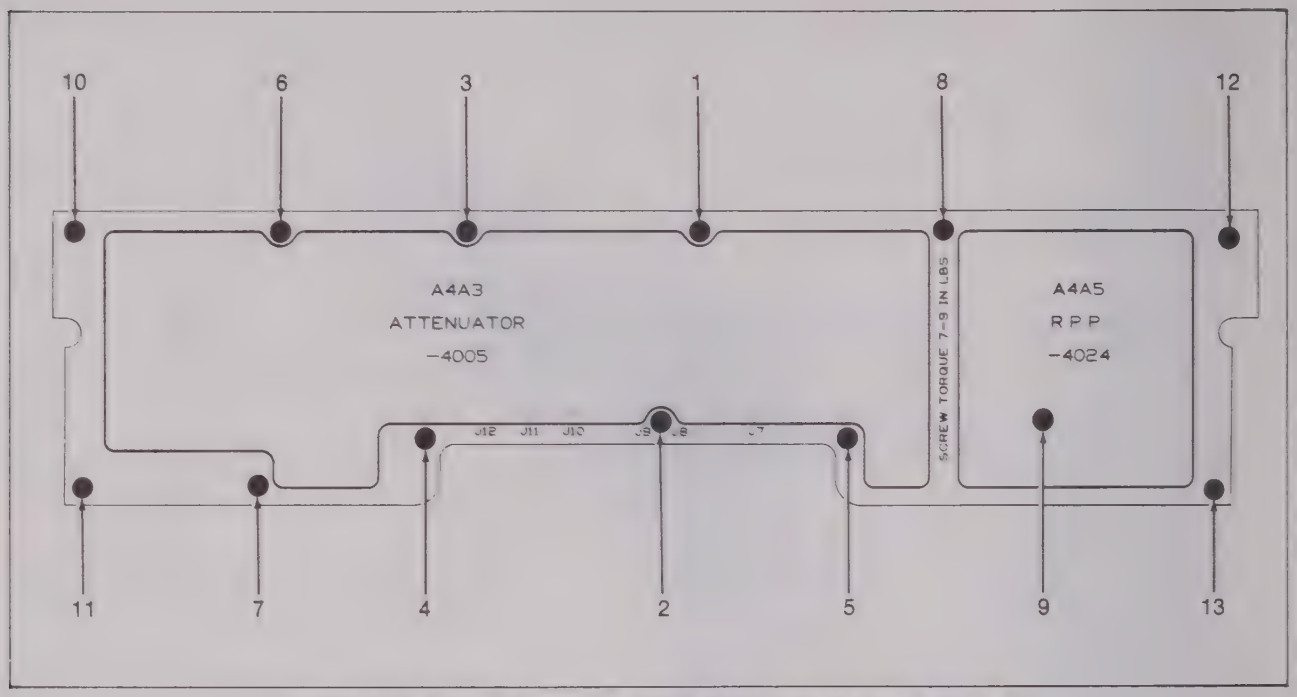

Figure 3-13. Torque Sequence, A4A3, A4A5, Top of Output Module

b. Traveling in the direction indicated, press the gasket into the groove.

c. The end of the gasket should be at the TERMINATE GASKET point shown in Figure 3-4.

4. Lower the cover carefully in place and start all the screws through the washers. Do not tighten any of the screws.

5. Use an electric torque screwdriver to tighten all the screws according to the following procedure:

a. Torque all screws to 3 inch-pounds in the numercial sequence shown in Figure 3-13.

b. Torque all screws 7 to 9 inch-pounds in the numerical sequence shows in Figure 3-13. The torque value should be the same for all screws.

6. Swing the Output Module back into place using the following procedures:

a. Remove the two screws (H3) from position B.

b. Swing the Output Module partially back into position.

c. Refer to Figure 3-8 and connected J10, J11, and J12.

d. Fasten the two screws (H3) into Position A (Figure 3-9) and fasten the four washers and screws (H1 and H2) back in place.

e. Refer to Figure 3-8 and connect J1, J4, J5, J13, and J14.

7. Complete the assembly portion of the Interior Access Procedure.

3-47. A4A4 AND A4A8 PRINTED CIRCUIT BOARDS ACCESS PROCEDURE

CAUTION

To prevent damage to the coaxial cables and connectors, observe the following cautions when handling the cables and connectors.

1. Do not bend the cables.

2. Do not place excessive strain between the cables and the connectors.

3. Start SMA connectors carefully; keep the connector straight with respect to the jack.

3-48. Introduction

3-49. The A4A4 Modulator Divider and the A4A8 Heterodyne Oscillator printed circuit boards are located in the top of the Output Module (Figures 3-1 and 3-4). The access procedure allows access to the printed circuit

boards for troubleshooting procedures. After the cover has been removed, the cover screws must be torqued back in place to insure specific RF integrity. Figures 3-4, 3-8, 3-9, and 3-14 illustrate the disassembly and assembly procedures.

3-50. Disassembly Procedure

3-51. Complete the following procedure to gain access to the A4A4 and A4A8 printed circuit boards.

1. Set the front panel POWER control to STBY. Set the rear panel MAIN POWER control to OFF. Remove line power from the instrument.

2. Complete the disassembly portion of the Interior Access Procedure.

3. Complete the following steps to swing out the Output Module:

   a. Refer to Figure 3-8 and disconnect J1, J4, J5, J13, and J14.

   b. Remove the four screws and washers (H1 and H2) and the two screws (H3) shown in Figure 3-9.

   c. Lift the Output Module until J10, J11, and J12 can be reached. Disconnect J10, J11, and J12.

   d. Swing the module out 90 degrees and lock it in this position by installing the two screws (H3) in position B. Remove the A4A41A4A8 cover.

4. Carefully lift the cover off; do not disturb the RF gasket under the cover.

5. If the instrument is to be operated (for troubleshooting procedures) jumper cables from the 6070A/6071A Servie Kit must be installed. For the troubleshooting procedures, install two jumper cables: one from A4AJ5 to A3AJ3 and one from A4AJ13 to A3AJ10.

3-52. Assembly Procedure

3-53. Complete the following procedure to assemble the instrument:

1. Remove the jumper cables that have been installed.

2. Make sure the RF gaskets are in place (Figure 3-4) and inspect the RF gaskets for damage (areas that are folded over, worn, or pinched).

3. If a RF gasket falls out, use the following steps to properly install it:

   a. Start the gasket at the START GASKET point shown in Figure 3-4.

   b. Traveling in the direction indicated, press the gasket into the groove.

   c. The end of the gasket should be at the TERMINATE GASKET point shown in Figure 3-4.

4. Lower the cover carefully in place and start all the screws through the washers. Do not tighten any of the screws.

5. Use an electric torque screwdriver to tighten all the screws according to the following procedure:

   a. Torque all screws to 3 inch-pounds in the numerical sequence shown in Figure 3-14.

   b. Torque all screws 7 to 9 inch-pounds in the numerical sequence shows in Figure 3-14. The torque value should be the same for all screws.

6. Swing the Output Module back into place using the following procedures:

   a. Remove the two screws (H3) from position B (Figure 3-9).

   b. Swing the Output Module toward the instrument until J10, J11, and J12 can be connected. Connect J10, J11, and J12 (Figure 3-8).

   c. Swing the Output Module completely back into position.

   d. Fasten the two screws (H3) into Position A (Figure 3-8) and fasten the four washers and screws (H1 and H2) back in place.

   e. Refer to Figure 3-8 and connect J1, J4, J5, J13, and J14.

7. Complete the assembly portion of the Interior Access Procedure.

3-54. POWER SUPPLY ACCESS PROCEDURE

WARNING

HIGH VOLTAGES ARE EXPOSED WHEN THE POWER SUPPLY IS DISASSEMBLED. REMOVE LINE POWER BEFORE STARTING DISASSEMBLY AND ABSERVE ALL APPLICABLE SAFETY PRECAUTIONS IF LINE POWER IS RECONNECTED TO THE INSTRUMENT BEFORE THE POWER SUPPLY IS ASSEMBLED.

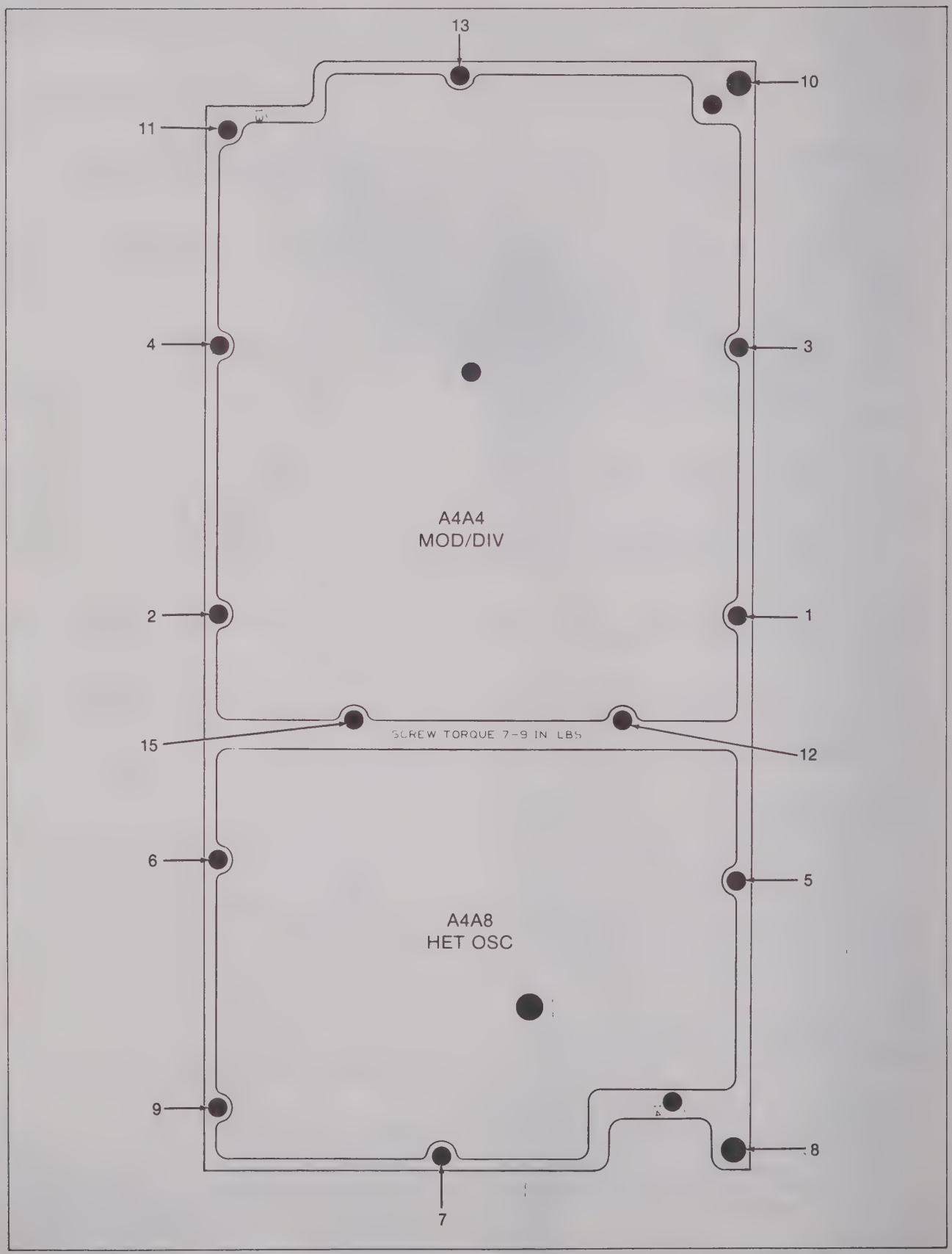

Figure 3-14. Torque Sequence, A4A4, A4A8, Top of Output Module

3-55. Introduction

3-56. The following procedures describe the access to all power supply PCBs and the Series Pass Voltage Regulator printed circuit boards. The power supply printed circuit boards are located in the Power Supply Assembly (Figure 3-9). The power supply printed circiut boards are: A5A1 Power Supply PCB, A5A2 Auxiliary Power Supply Regulator PCB, A5A3 Auxiliary Transformer PCB, A5A4 Input Rectifier PCB, A5A5 Switching Transistors. The A5A6 Power Supply Capacitor PCB is attached to the rear panel (Figure 3-1) and is easily accessible. The Series Pass Voltage regulator PCBs (A6A2, A6A3, A6A4) are located adjacent to the power supply assembly cover are easily accessible. Figures 3-8 and 3-9 illustrate the disassembly and assembly procedures.

3-57. Disassembly Procedure

3-58. Use the following procedure to access all Power Supply Assembly PCBs, and the Series-Pass Voltage Regulator PCBs.

1. Set the front panel POWER control and the rear panel MAIN POWER switch to the OFF positions and remove line power from the instrument.

2. Complete the disassembly portion of the Interior Access Procedure.

3. Remove the washers and locking nuts (H4 and H5) from the BNC and Type-N connectors at the left side (facing from the rear of the instrument) of the rear panel (Figure 3-8).

4. On the A6A2 Series Pass Motherboard PCB (directly in front of the fan), disconnect cable connectors from J4, J5, J6, and J7 (Figure 3-9).

5. Under the A6A2 Series Pass Motherboard PCB, remove the folded portion of the IEEE cable from the retaining strap (Figure 3-9).

6. Remove the 12 screws (H6) that connect the Rear Panel Assembly to the instrument.

7. If the 607XA-130 Oven Reference Option is not installed, go to step 8. If the 607XA-130 Oven Reference Option is installed, remove this option by following the 607XA-130 Disassembly procedures in Section 7.

8. Pull the Rear Panel Assembly from the instrument.

9. Rotate the Rear Panel Assembly so that it rests upon the back of the handles.

10. Remove the six screws (H7) that hold the power supply cover in place.

11. Slide the power supply cover off the power supply. The power supply is now accessible.

3-59. Assembly Procedure

3-60. Complete the following steps to assemble the instrument.

1. Make sure that the front panel POWER control is in the STBY position, that the rear panel MAIN POWER switch is in the OFF position, and that the instrument is disconnected from line power.

2. Slide the power supply cover in place and secure it using the six screws (H7) that were previously removed.

3. Slide the Rear Panel Assembly partially back into place. Be careful to insert all of the BNC and Type-N connectors through the appropriate holes in the Rear Panel Assembly.

4. Connect appropriate cable connectors to Series Pass Motherboard J4, J5, J6, and J7.

5. Fold the IEEE cable and insert the fold under the retaining strap.

6. Slide the Rear Panel Assembly completely into place and secure it using the 12 screws (H6, Figure 3-9).

7. Fasten the BNC and Type-N connectors to the rear panel using the washers and locknuts (H6, H5, Figure 3-8).

8. If the 607XA-130 Oven Reference Option is not supplied with this instrument go to Step 9. If the 607XA-130 Oven Reference Option is supplied, install it by following the 607XA-130 assembly procedure in Section 7 before going to Step 9.

9. Complete the assembly portion of the Interior Access Procedure.

3-61. DELAY CABLE ASSEMBLY ACCESS PROCEDURE

CAUTION

To prevent damage to the coaxial cables and connectors, observe the following cautions when handling the cables and connectors.

1. Do not bend the cables.

2. Do not place excessive strain between the cables and theconnectors.

3. Start SMA connectors carefully; keep the connector straight with respect to the jack.

3-62. Introduction

3-63. The Delay Cable Assembly is located in the interior of the 6070A/6071A as shown in Figure 3-1. The access procedure allows access to remove and replace the Delay Cable Assembly. Figures 3-1, 3-8, 3-9, and 3-11 illustrate the disassembly and assembly procedures.

3-64. Disassembly Procedure

3-65. Complete the following procedure to gain access to the Delay Cable Assembly.

1. Set the front panel POWER control and the rear panel MAIN POWER switch to the OFF positions and remove line power from the instrument.

2. Complete the disassembly portion of the Interior Access Procedure.

3. Swing the Synthesizer Module out using the following procedure:

   a. Refer to Figure 3-8 and disconnect J3, J5, J6, J7, J8, J9, J10, J11, and J12.

   b. Remove the four screws and washers (H1 and H2) and two screws (H3) shown in Figure 3-9.

4. Complete the following steps to swing out the Output Module:

   a. Refer to Figure 3-8 and disconnect J1, J4, J5, J13 and J14.

   b. Remove the four screws and washers (H1 and H2) and the two screws (H3) shown in Figure 3-9.

   c. Lift the Output Module until J10, J11, and J12 can be reached. Disconnect J10, J11, and J12.

5. Turn the 6070A on its side and swing the synthesizer module and output module partially out (Figure 3-1).

6. Swing the Synthesizer Module out 90 degrees and lock it in this position by installing the two screws (H3) in position B (Figure 3-9).

7. Remove the six screws that secure the cable assembly to the side chassis assembly and carefully remove the cable assembly from the 6070A (Figure 3-11).

3-66. Assembly Procedure

3-67. Complete the following procedure to assemble the instrument.

1. Insert the cable assembly and install the six screws that secure the cable assembly to the side chassis assembly.

2. Swing the synthesizer module back into place using the following procedure.

   a. Remove the two screws (H3) from position B.

   b. Swing the Synthesizer Module partially back into position.

   c. Refer to Figure 3-8 and connect J3, J5, J6, J7, J8, J9, J1p, J11, and J12.

   d. Fasten the two screws (H3) into position A (Figure 3-9) and fasten the four washers and screws (H1 and H2) back in place.

   e. Complete the assembly portion of the Interior Access Procedure (paragraph 3-10).

3. Swing the Output Module back into place using the following procedure.

   a. Swing the Output Module partially back into position.

   b. Refer to Figure 3-8 and connect J1, J4, J5, J14, J10, J11, and J12.

   c. Fasten the two screws (H3) into position A (Figure 3-9) and fasten the four washers and screws (H1 and H2) back in place.

   d. Complete the assembly portion of the Interior Access Procedure.

3-68. FRONT PANEL/CONTROLLER ASSEMBLY ACCESS PROCEDURE

3-69. Introduction

3-70. The Front Panel/Controller Assembly Access Procedure is the primary procedure to gain access to the circuit boards contained in each of the units. The procedure describes the removal of the Front Panel/Controller assembly from the 6070A/6071A. Figures 3-8 and 3-9 illustrate the disassembly and assembly procedures.

3-71. Disassembly Procedure

3-72. Use the following procedure to disassemble the Front Panel/Controller Assembly from the 6070A/6071A.

1. Set the front panel POWER control and the rear panel MAIN POWER switch to the OFF positions and remove line power from the instrument.

2. Complete the disassembly portion of the Interior Access Procedure.

3. Disconnect the cables from Controller J5, J6, and J7 (Figure 3-9).

4. Disconnect the Modulation Cables from Output Module J3, J12, and J14 (Figure 3-8).

5. Remove the 12 screws (H8) that secure the Front Panel Controller Assembly to the 6070A 6071A (Figure 3-9).

6. Remove the Front Panel Controller Assembly from the 6070A 6071A.

3-73. Assembly Procedure

3-74. Complete the following steps to assemble the Front Panel Controller to the 6070A 6071A.

1. Insert the Front Panel Controller Assembly between the side chassis assemblies as shown in Figure 3-9.

2. Align the screw holes and install the 12 screws (H8) that secure the Front Panel Controller Assembly to the instrument (Figure 3-9).

3. Connect the Modulation Cables from the Front Panel Controller Assembly to the Output Module: J3, J12, and J14 (Figure 3-8).

4. Connect the appropriate cables to the Controller: J5, J6, and J7 (Figure 3-9).

5. Complete the assembly portion of the Interior Access Procedure.

3-75. ENCODER ASSEMBLY ACCESS PROCEDURE

3-76. Introduction

3-77. The Encoder Assembly is located in the Front Panel Assembly as shown in Figure 3-15. The access procedure allows access to remove and replace the Encoder Assembly. Figures 3-9 and 3-15 illustrate the disassembly and assembly procedures.

3-78. Disassembly Procedure

3-79. Use the following procedure to disassemble the encoder assembly from the Front Panel Assembly.

1. Set the front panel POWER control and the rear panel MAIN POWERswitch to the OFF positions and remove line power from the instrument.

2. Complete the disassembly portion of the Front Panel Controller Assembly Access Procedure.

3. Remove the eight screws (H9) that secure the front panel to the Controller Assembly (Figure 3-9).

4. Disconnect the cable from J3 (Figure 3-15).

5. To remove the encoder knob, hold the tuning knob of the encoder assembly and turn the knob counterclockwise.

6. Hold the encoder and remove the three screws (H9, Figure 3-15) that hold the Encoder Assembly to the front panel and lift the assembly away from the front panel.

3-80. Assembly Procedure

3-81. Complete the following procedure to install the Encoder Assembly in the front panel.

1. Insert the Encoder Assembly in the front panel as shown in Figure 3-15.

2. Align the screw holes and secure the Encoder Assembly with the three screws H9 removed in the disassembly procedure (Figure 3-15).

3. Install the tuning knob by threading it onto the shaft of the Encoder. Hold the wheel of the Encoder Assembly while tightening the knob. Do not over tighten the knob on the shaft.

4. Connect the cable from the Controller Assembly to J3 (Figure 3-15).

5. Attach the Controller Assembly to the Front Panel Assembly and secure the units using the eight screws (H9) removed in the disassembly procedure (Figure 3-9).

6. Complete the assembly portion of the Front Panel Controller Access Procedure.

3-82. A1A1 FRONT PANEL ASSEMBLY PRINTED CIRCUIT BOARD ACCESS PROCEDURE

3-83. Introduction

3-84. The A1A1 Front Panel Printed Circuit Board is located in the Front Panel Assembly (Figures 3-9 and 3-15). The access procedure allows access to the printed circuit board for troubleshooting procedures. Figure 3-15 illustrates the disassembly and assembly procedures.

3-85. Disassembly Procedure

3-86. Complete the following procedure to gain access to the A1A1 printed circuit board.

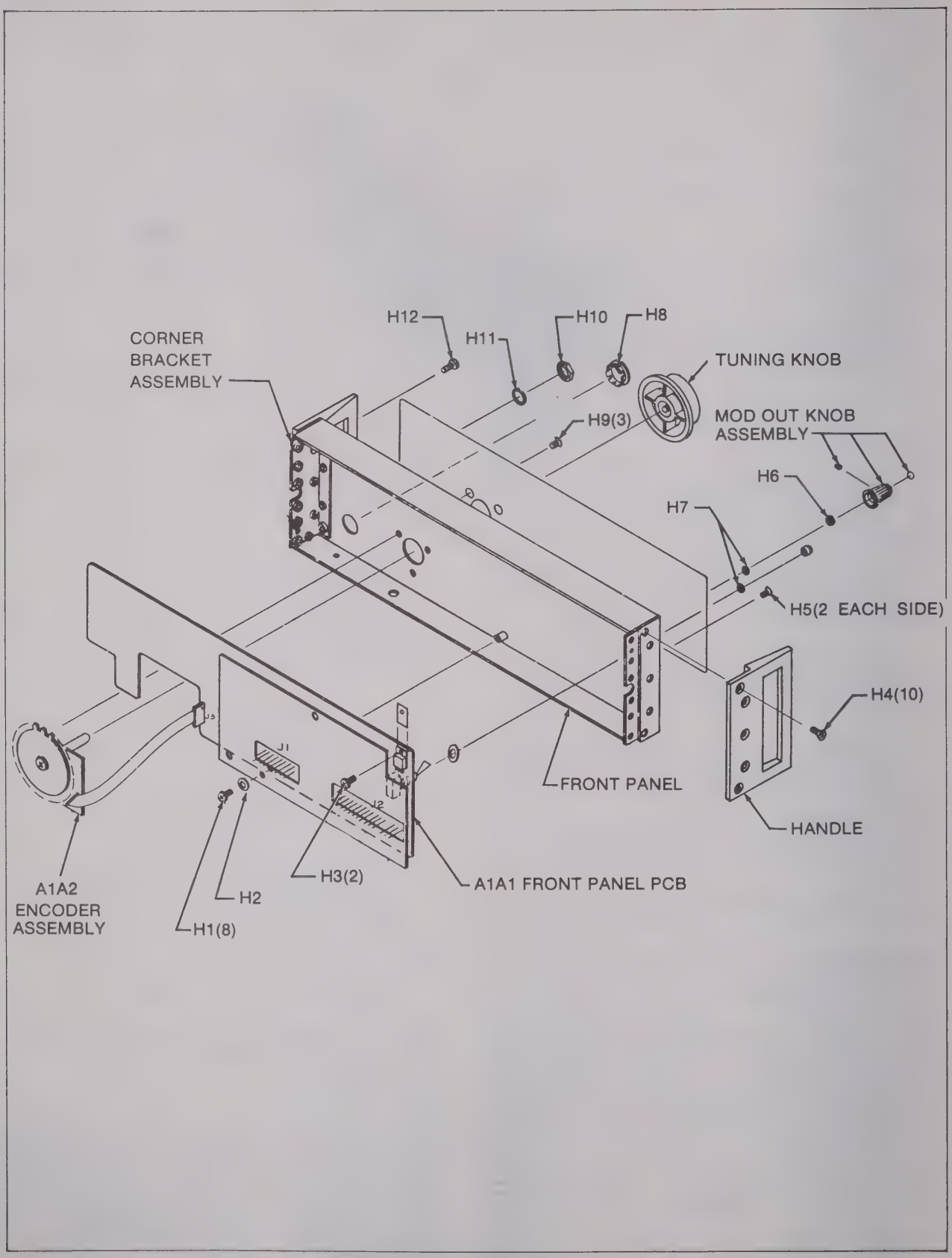

Figure 3-15. Front Panel Assembly

1. Remove the Encoder by completing the disassembly portion of the Encoder Assembly Access Procedure.

2. Disconnect the cables from J1 and J2.

3. Loosen the Allen screw in the MOD OUT knob and remove the knob from the front panel (Figure 3-15).

4. Remove the Hex nuts and washers from the BNC connectors and controls (Figure 3-15).

5. Remove the nylon screw (H3) and eight Phillips head screws (H1) that secure the A1A1 circuit board to the front panel (Figure 3-15).

6. Remove the A1A1 PCB from the front panel chassis.

3-87. Assembly Procedure

3-88. Complete the following procedure to assemble the instrument.

1. Orient the A1A1 PCB controls and BNC connectors with respect to the front panel chassis.

2. Carefully insert the A1A1 PCB into the front panel chassis assembly making sure controls are fully extended through the front panel.

3. Install the nylon screw (H3) and eight Phillips head screws (H1) removed in the disassemble procedure (Figure 3-15).

4. Install the washers and hex nuts to the appropriate BNC connectors and controls.

5. Install the knob on the MOD OUT control and tighten the allen screw (Figure 3-15).

6. Connect the cables to J1 and J2.

7. Complete the assembly portion of the Encoder Assembly Access Procedure.

3-89. A2A1 CONTROLLER PRINTED CIRCUIT BOARD ACCESS PROCEDURE AND A2A4 CONTROLLER MOTHERBOARD ACCESS PROCEDURE

3-90. Introduction

3-91. The A2A1 Controller Printed Circuit Board and the A2A4 Controller Motherboard are located in the Controller Assembly. The access procedure allows access to the printed circuit boards for troubleshooting procedures. Figures 3-9 and 3-16 illustrate the disassembly and assembly procedures.

3-92. Disassembly Procedure

3-93. Complete the following procedure to gain access to the A2A1 Controller PCB.

1. Complete the disassembly portion of the Front Panel/Controller Access Procedure

2. Remove the eight screws (H9) that secure the Controller Assembly to the Front Panel Assembly (Figure 3-9).

3. Disconnect the cables from J3 and J4 on the Controller Assembly (Figure 3-16).

4. Remove the RF OUTPUT connector from Controller Chassis Assembly (Figure 3-16).

5. Remove the six screws (H4) from the shield and lift the shield away from Controller Assembly (Figure 3-16).

6. If the unit contains the accessory A2A2 Nonvolatile Memory PCB, remove the five screws (H3) that secure the A2A2 Nonvolatile Memory PCB and remove the circuit board (Figure 3-16).

7. Remove the seven screws (H1) from A2A1 Controller PCB and remove the circuit board from the Controller Chassis (Figure 3-16).

8. Remove the six screws (H5) from the A2A4 Controller Motherboard and remove the motherboard from the Controller Chassis Assembly (Figure 3-16).

3-94. Assembly Procedure

3-95. Complete the following procedure to assemble the instrument.

1. Insert the A2A4 Controller Motherboard into the Controller Chassis Assembly and secure it using the six screws (H5) removed in the disassembly procedure.

2. Insert the A2A1 Controller PCB into the Controller Chassis Assembly and secure it using the seven screws (H1) removed in the disassembly procedure (Figure 3-16).

3. If the unit is supplied with the optional accessory A2A2 Nonvolatile Memory PCB, install the A2A2 PCB in place, and secure it using the five screws (H3) removed in the disassembly procedure (Figure 3-16).

4. Install the shield and secure it using the six screws (H4) removed in the disassembly procedure (Figure 3-16).

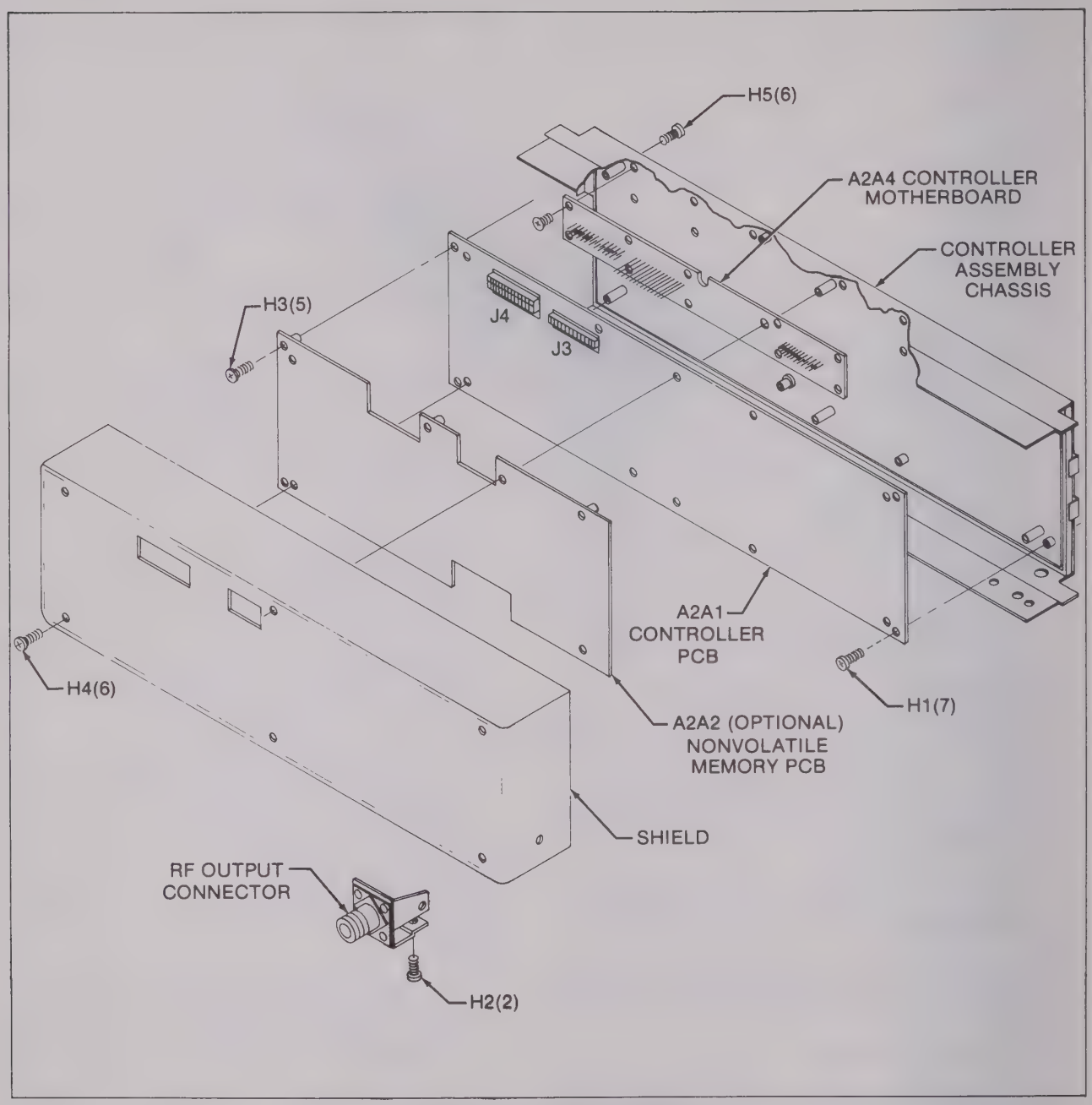

Figure 3-16. Controller Assembly

5. Install the RF OUTPUT CONNECTOR to the Controller Assembly Chassis andsecure it using the two screws (H2) (Figure 3-16) removed in the disassembly procedure (Figure 3-16).

6. Connect cables to J3 and J4 then assemble the Controller Assembly to the Front Panel Assembly.

7. Secure the units using the eight screws removed in the disassembly procedure (Figure 3-9).

8. Complete the assembly portion of the Front Panel Controller Access Procedure.

3-96. A6A1 IEEE CONNECTOR PCB ACCESS PROCEDURE

3-97. Introduction

3-98. The A6A1 IEEE Connector PCB is attached to the rear panel. The access procedure allows access to the printed circuit board for troubleshooting procedures. Figures 3-17 illustrates the disassembly and assembly procedures.

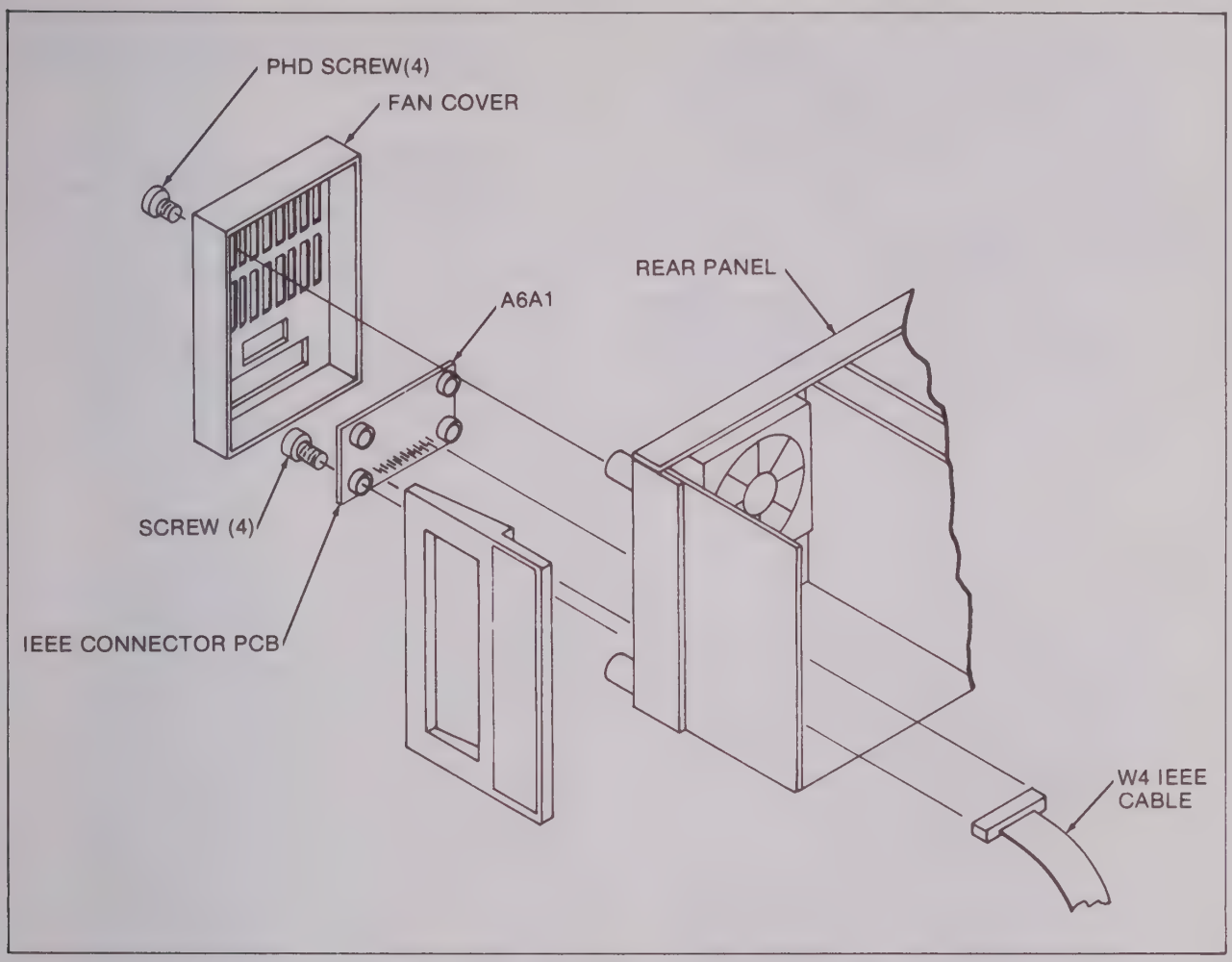

Figure 3-17. A6A1 IEEE Connector PCB Access

3-99. Disassembly Procedure

3-100. Complete the following procedure to gain access to the A6A1 printed circuit board.

1. Set the front panel POWER control to STBY. Set the rear panel MAIN POWER switch to OFF. Disconnect the instrument from line power.

2. Complete the disassembly portion of the Interior Access Procedure.

3. Swing the Synthesizer Module out using the following procedure:

   a. Refer to Figure 3-8 and disconnect J3, J5, J6, J8 and J10.

   b. Remove the four screws and washers (H1 and H2) and two screws (H3) shown in Figure 3-9.

4. Disconnect the IEEE cable from the IEEE connector PCB (Figures 3-9 and 3-17).

5. Remove the four Phillips head screws that hold the fan cover to the rear panel.

6. Remove the four screws that hold the A6A6 connector PCB to the rear panel.

3-101. Assembly Procedure

3-102. Complete the following procedure to assemble the instrument.

1. Align the screw holes and secure the IEEE PCB with the four screws previously removed (Figure 3-17).

2. Align the screw holes and secure the fan cover to the rear panel with the four Phillips head screws previously removed (Figure 3-17).

3. Connect the IEEE cable to the IEEE connector PCB.

4. Swing the Synthesizer Module back into place using the following procedure:

CAUTION

To aviod cable damage when swinging the synthesizer module back in place, make sure that the cables between the synthesizer plate and the delay line are in the positions shown in Figure 3-11.

a. Remove the two screws (H3) from the Position B holes.

b. Swing the Synthesizer Module completely into position; make sure that the semirigid coaxial cables between the Synthesizer Module and the Delay Line are in the positions shown in Figure 3-11. This insures that these cables are not damaged by one of the screws in the Synthesizer Module cover or by cables being crossed over one another.

c. Fasten the two screws (H3) into position A (Figure 3-9) and fasten the four washers and screws (H1 and H2) back in place.

d. Refer to Figure 3-8 and connect J3, J5, J6, J7, J8, J9, and J10.

5. Complete the assembly portion of the Interior Access Procedure.

Section 4
Troubleshooting

4-1. INTRODUCTION

4-2. The information in this section provides general maintenance criteria for the 6070A/6071A Synthesized RF Signal Generator. Maintenance on the generator should be performed only by qualified technicians and personnel familiar with this type of equipment.

4-3. Maintenance adjustments of the 6070A/6071A can be separated into three categories: (1) calibration procedures, (2) manual non-routine adjustments, and (3) adjustments that require reprogramming of the Calibration EPROM. The calibration procedures are described in the Calibration Manual. The manual non-routine adjustments are described in Section 5 of this manual. The adjustments that require reprogramming of the Calibration EPROM require the use of a controller. Information on reprogramming of the Calibration EPROM is not given in this manual. Instead, the user is urged to return the generator to the nearest John Fluke Service Center when reprogramming of the Calibration EPROM is required. Refer to the Shipping and Service information that is given in Section 2 of the Calibration Manual.

4-4. ACCESS AND ASSEMBLY IDENTIFICATION

4-5. Access to the major assemblies is described in Section 3, Access Procedures. Section 3 also contains illustrations that identify the location of the major assemblies.

4-6. TROUBLESHOOTING

4-7. Section 4 restricts the discussion of the RF generator troubleshooting to suggestions of techniques for pinpointing trouble to a particular assembly. Once the faulty component is located, normal troubleshooting procedures are required. The following paragraphs suggest a few possible locations and causes of various symptoms.

WARNING

HIGH VOLTAGES ARE EXPOSED WHEN PERFORMING MAINTENANCE PROCEDURES ON AND NEAR THE POWER SUPPLY. OBSERVE ALL APPLICABLE SAFETY PRECAUTIONS IF LINE POWER IS CONNECTED TO THE INSTRUMENT.

CAUTION

To prevent component damage, observe static awareness precautions. Refer to the yellow insert sheet.

4-8. Error Codes (Self Check) at Power-On

4-9. At power-on the instrument model number (6070A or 6071A)appears in the FREQUENCY display, and the self test error code (0001, 0002, etc) appears in AMPLITUDE DISPLAY. The self test error codes are additive. For example, if the instrument failed the ROM test, the scratch pad memory RAM test, and the angle modulation test, the AMPLITUDE display would be 0205 as shown below:

ROM test failed	=0001
Scratch pad memory RAM test failed	=0004
Angle Modulation test failed	=0200
AMPLITUDE display	=0205

4-10. The following table lists the Error Codes, Probable Cause, and Probable Fault Location for each error code.

4-11. UNCAL Annunciator Error Codes

4-12. Tables 4-2 and 4-3 list only the UNCAL annunciator error codes that indicate a hardware

malfunction. The tables list the error code, probable cause, and probable fault location to correct the indicated malfunction. Note that most UNCAL annunciator error codes indicate an incorrect signal output for the instrument. Refer to Section 5E of the 6070A/6071A Operator Manual for a complete listing and description of the displayed uncalibrated (UNCAL) error codes.

4-13. Front Panel Connectors

4-14. Table 4-4 is a quick reference table listing the front panel connectors, the connecting cable, and the associated printed circuit boards. Refer to the wiring diagram in the 6070A/6071A Schematic Manual.

4-15. Rear Panel BNC Connectors

4-16. Table 4-5 is a quick reference table listing the rear panel connectors with associated connecting cable and printed circuit boards. Also refer to the wiring diagram in the 6070A/6071A Schematic Manual.

Table 4-1. Error Codes (Self Check) at Power-On

SYMPTOM	PROBABLE CAUSE	PROBABLE FAULT LOCATION
0001	ROM test failed.	1. Fault in A2A1 Controller PCB (U7 through U10 and U12 through U15).
0002	Calibration EPROM test failed.	1. Fault in A2A1 Controller PCB (U11).
0004	Scratch Pad Memory RAM test failed.	1. Fault in A2A1 Controller PCB (U2 through U4).
0010	Nonvolatile Memory test failed.	1. Fault in A2A2 Nonvolatile PCB.
0020	Mod/Divider test failed.	1. Fault in A4A4 Modulator/Divider PCB. 2. Fault in A4A9 Heterodyne Converter PCB. 3. Fault in A4A8 Heterodyne Oscillator PCB.
0040	Delay Discriminator Not Read test failed.	1. Fault in A3A3 Delay Discriminator PCB.
0100	Amplitude Modulation test failed.	
0400	Control Cable Continuity test error.	1. Faulty control cables to: A3A8 Synthesizer PCB A3A4 N/1 PCB. A4A4 Modulation Divider
1000	Frequency Doubler test failed.	1. Fault in A4A6 Output Amplifier PCB.
2000	Power-on Template recall failure.	1. Fault in A2A1 Controller PCB (U2 thru U4). 2. Fault in A2A1 Controller PCB (U7 thru U10, U12 thru U15). 3. Fault in A2A2 Non-volatile Memory PCB.
4000	Sub-Synthesizer.	1. Fault in A3A7 Sub-Synthesizer PCB.
10000	IEEE-488 Interface test failed.	1. Fault in controller interface on A2A1 Controller PCB.

Table 4-2. Modulation Display UNCAL Errors Codes

SYMPTOM	PROBABLE CAUSE	PROBABLE FAULT LOCATION
040 in MODULATION display	Error in discriminator loop.	1. The DIUNL signal path (cable W3) between A2A1 Controller and Synthesizer Module. 2. Fault in A2A1 Controller PCB.

Table 4-3. Frequency Display UNCAL Error Codes

SYMPTOM	PROBABLE CAUSE	PROBABLE FAULT LOCATION
010 in FREQUENCY display	Sub-synthesizer out of lock.	1. The SSULKL signal path (Cable W3) between A2A1 Controller and Synthesizer Module. 2. Fault in A2A1 Controller PCB. 3. Fault in A3A9 Synthesizer Distribution PCB. 4. Fault in A3A7 Sub-synthesizer PCB.
020 in FREQUENCY display	Delay Discriminator Fault.	1. The DDNRL signal path (Cable W3) between A2A1 Controller and Synthesizer Module. 2. Fault in A2A1 Controller PCB. 3. Fault in A3A9 Synthesizer Distribution PCB. 4. Fault in A3A3 Delay Discriminator PCB.
040 in FREQUENCY display	Main Loop out of lock.	1. The RPD signal path (Cable W3) between A2A1 Controller and Synthesizer Module. 2. Fault in A2A1 Controller PCB. 3. Fault in A3A9 Synthesizer Distribution PCB. 4. Fault in A3A1 Phase Detector PCB. 5. Any A3 Synthesizer Assembly PCB.

Table 4-4. Index of Front Panel Connectors

CONNECTOR	CONNECTING CABLE	PRINTED CIRCUIT BOARDS
MOD IN	Cable W10 between A1A1 Front Panel PCB (E1, E2) and Output Module J12 (A4A10J12).	A1A1 Front Panel. A4A10 Modulation Distribution.
MOD OUT (20 kHz 200 kHz)	Cable W11 between A1A1 Front Panel PCB (E2, E4) and Cable W53. Cable W52 to Output Module J14 (A4A2J14).	A1A1 Front Panel. A4A2 Modulation Oscillator.
RF OUTPUT	Cable W50 between A1A3 Output Connector and Output Module J3 (A4A4J3).	A4A5 Reverse Power Protect. A4A3 Attenuator. A4A7 Output Amplifier or A4A6 X2 Output Amplifier.
SWP OUT	Connector Mounted on the A1A1 Front Panel Assembly	A1A1 Front Panel.

Table 4-5. Index of Rear Panel BNC Connectors

BNC CONNECTOR	CONNECTING CABLE	CIRCUIT BOARDS
AUX OUTPUT (Option -831)	Cable W26 between rear panel BNC and Output Module J6 (A4A7J6).	A4A7 Output Amplifier.
MOD IN	Cable W25 between rear panel BNC and Output Module J11 (A4A10J11).	A4A10 Modulation Distribution.
PEN LIFT and OUT VALID	Cable W24 between rear panel BNC and Output Module J8 (A4A10J8).	A4A10 Modulation Distribution.
REF IN (External Timebase Ref Signal)	Cable W20 between rear panel BNC and Synthesizer Module J6 (A3A2J6).	A3A2 10 MHz Reference.
REF OUT (10 MHz Signal)	Cable W21 between rear panel BNC and Synthesizer Module J7 (A3A2J7).	A3A2 10 MHz Reference.
RF OUT (Option -830)	Cable W51 between A6A5 Rear Output Connector and Output Module J3 (A4A5J3).	A4A5 Reverse Power Protect. A4A3 Attenuator. A4A7 Output Amplifier or A4A6 X2 Output Amplifier.

4-17. Printed Circuit Board Adjustable Components and Controls

4-18. Table 4-6 lists the printed circuit board adjustable components and controls. Every printed circuit board in the 6070A/6071A is listed. The REFERENCE column in the table sorts the adjustable components and controls into four catagories; those adjustable components and controls thatcan be repaired, replaced, or adjusted using the routine adjustment procedures (6070A/6071A Calibration Manual); those adjustable components and controls that can be repaired, replaced, or adjusted using the non-routine adjustment procedures provided in Section 5 of this manual; those adjustable components and controls that cannot be repaired, replaced, or adjusted without having to reprogram the Calibration EPROM, and those adjustable components and controls that are factory adjustments. The adjustments that require reprogramming the Calibration EPROM require the use of a controller. Do not touch these components unless your facility is capable of reprogramming the Calibration EPROM. Do not touch components that require factory adjustment.

4-19. Printed Circuit Board Switches

4-20. Table 4-7 contains a list of switches that are located on the 6070A/6071A printed circuit boards.

4-21. A3A3 Discriminator PCB, Replacement Parts, and EPROM Calibration Information

4-22. If the following adjustment controls are disturbed, a major recalibration of the EPROM will be required. The controls are: R24, R48, R50, and R110.

4-23. Replacement of any part listed in the following table will require resetting the subject controls and subsequent recalibration of the Calibration EPROM. If any part(s) in Table 4-8 is (are) replaced, and consequently the subject controls need adjusting, the user is urged to return the signal generator to the nearest John Fluke Service Center.

4-24. A3A5, A3A10 VCO Resonator PCB

4-25. The A3A5 VCO and the A3A10 VCO operate as a matched pair set, and they are closely associated with the Synthesizer Plate/EPROM calibration. Consequently, if repair or service is required, the user is urged to return the signal generator to the nearest John Fluke Service Center.

4-26. A4A3 Attenuator PCB, Replaceable Parts and EPROM Calibration Information

4-27. Replacing of relays K1 through K6 and resistors R22 through R39 requires reprogramming the level correction portion of the Calibration EPROM. If these components are replaced, the user is urged to return the signal generator to the nearest John Fluke Service Center.

Table 4-6. Printed Circuit Board Adjustment Controls

PRINTED CIRCUIT BOARD	CONTROL	FUNCTION	REFERENCE
A1A1, A1A2 Front Panel PCB	R30	1 (MOD OUT)	Front Panel Control.
A2A1 Controller PCB	No Adjustments		
A2A2 Non-Volatile Memory PCB	No Adjustments		
A3A1 Phase Detector PCB	R2 Voltage	Equilization Network Offset Compensation.	Factory Adjust Only.
	R4	High-rate, FM/ØM Deviation.	See Calibration Manual for Adjustment Procedure.
	R5	High-rate, FM/ØM Balance.	See Calibration Manual for Adjustment Procedure.
	R10	Low-rate, FM Deviation.	See Calibration Manual for Adjustment Procedure.
	R10	Low-rate, FM Deviation.	See Calibration Manual for Adjustment Procedure.
	R12	Low-rate, ØM Deviation.	See Calibration Manual for Adjustment Procedure.
	R25	Low noise (discriminator) Loop Bandwidth Adjust.	Requires EPROM Reprogrammed.
	R35	Integrator Offset Adjust.	See Section 5 for non-routine adjustment procedure.
	R37	VCO Control Voltage (only with SW1 in Test).	Factory Adjust Only.
	L4, L5	Low Pass Filter Adjust.	Factory Adjust Only.
A3A2 10 MHz Reference PCB	C9	Crystal Oscillator Frequency.	See Calibration Manual for Adjustment Procedure.
A3A3 Discriminator PCB	R24	Leveling Loop Level Adjustment.	Requires EPROM Reprogrammed.
	R45	Phase Shifter Zero Adjustment.	See Section 5 for non-routine adjustment procedure.
	R48, R50	Varactor Tuned Filter Shape Factor Adjustment.	Required EPROM Reprogrammed.
	R53	Not HI DEV Mode: Low-Rate, 99.9 kHz Deviation.	See Calibration Manual for Adjustment Procedure.
	R67	Not HI DEV Mode: Low-Rate, 199 kHz Deviation.	See Calibration Manual for Adjustment Procedure.

Table 4-6. Printed Circuit Board Adjustment Control (cont)

PRINTED CIRCUIT BOARD	CONTROL	FUNCTION	REFERENCE
	R86	Discriminator Zero Adjustment.	See Section 5 for non-routine Adjustment Procedure.
	R103	HI DEV Mode: High Rate Deviation.	See Calibration Manual for Adjustment Procedure.
	R110	HI DEV Mode: Loop Bandwidth Adjustment.	Requires EPROM Reprogrammed.
	R146	FET Tracking Adjustment.	See Section 5 for non-routine Adjustment Procedure.
A3A4 N/1 Divider PCB	No adjustments		
A3A5, A3A10 VCO	No adjustments		
A3A6 SSB Mixer PCB	R30	Phase Detector Gain. Adjusted for FM flatness.	See Section 5 for non-routine Adjustment Procedure.
	R51	Lower Frequency Limit.	See Section 5 for non-routine Adjustment Procedure.
	R52	Upper Frequency Limit.	See Section 5 for non-routine Adjustment Procedure.
A3A7 Sub Synthesizer PCB	L5	VCO Frequency Adjust.	See Section 5 for non-routine Adjustment Procedure.
A3A8 Synthesizer Control Buffer PCB		No Adjustments.	
A3A9 Synthesizer Distribution PCB	C9	High Frequency Compensation.	See Section 5 for non-routine Adjustment Procedure.
	R8	KV DAC (U8) Offset Adjust.	See Section 5 for non-routine Adjustment Procedure
	R10	Overall Deviation Calibration.	See Calibration Manual.
A4A2 Modulation Oscillator PCB	R6	Mod Oscillator Level.	See Calibration Manual.
	R13	FET Bias Adjustment.	See Section 5 for non-routine Adjustment Procedure.
	R23	Offset Voltage Adjustment, U8.	See Section 5 for non-routine Adjustment Procedure.
	R27	Bias Current Compensation Adjust, U13.	See Section 5 for non-routine Adjustment Procedure.
A4A3 Attenuator PCB	No Adjustment Controls.		

Table 4-6. Printed Circuit Board Adjustment Control (cont)

PRINTED CIRCUIT BOARD	CONTROL	FUNCTION	REFERENCE
A4A4 Modulator Divider	R24	Modulator Gain Adjust, U18. Part of loop BW Adjustment.	Factory Adjust Only.
	R26	Modulator Gain Adjust, U10. Part of Loop BW Adjustment.	Factory Adjust Only.
	R28	Modulator Gain Adjust, U8. Part of Loop BW Adjustment.	Factory Adjust Only.
	R30	Modulator Gain Adjust, U12. Part of Loop BW Adjustment.	Factory Adjust Only.
	R32	Modulator Gain Adjust, U5. Part of Loop BW Adjustment.	Factory Adjust Only.
	R39	Modulator Gain Adjust, Q3. Part of Loop BW Adjustment.	Factory Adjust Only.
	R47	Modulator Gain Adjust, Q4. Part of Loop BW Adjustment.	Factory Adjust Only.
	R88	ALC Gain Adjust, U2.	Requires EPROM Reprogramming.
A4A5 Reverse Power Protect PCB	R7	RPP Trip Level.	See 607XA-890 Option In Calibration Manual.
A4A6 X2 Output Ampl PCB (6071A only)	C22	Select <5 MHz ALC Loop Bandwidth.	Requires EPROM Reprogramming.
	C23	Select <5 MHz ALC Loop Bandwidth.	Requires EPROM Reprogramming.
	R20	Adjust U2 Current Harmonics.	Requires EPROM Reprogramming.
	R29	>5 MHz Detector Offset.	See Calibration Manual for Adjustment Procedure.
	R35	>5 MHz, <5 MHz Detector Balance.	Requires EPROM Reprogramming.
	R37	<5 MHz Detector Offset.	See Calibration Manual for Adjustment Procedure.
	R53	U15 Input Offset Zero.	See Calibration Manual for Adjustment Procedure.
	R60	U16 Input Offset.	See Section 5 for non-routine Adjustment Procedure.
	R75	U17 Input Offset.	See Section 5 for non-routine Adjustment Procedure.

Table 4-6. Printed Circuit Board Adjustment Control (cont)

PRINTED CIRCUIT BOARD	CONTROL	FUNCTION	REFERENCE
	R89	Adjust U9 Current, Harmonics.	See Section 5 for non-routine Adjustment Procedure.
	R91	Subharmonic Adjust.	See Section 5 for non-routine Adjustment Procedure.
A4A7 Output Ampl PCB (6070A only)	C51	Select <5 MHz ALC Loop Bandwidth.	Requires EPROM Reprogramming.
	C52	Select <5 MHz ALC Loop Bandwidth.	Requires EPROM Reprogramming.
	R4	>5 MHz Detector Offset.	See Calibration Manual for Adjustment Procedure.
	R6	<5 MHz Detector Offset.	See Calibration Manual for Adjustment Procedure.
	R9	U4 Input Offset Zero.	See Calibration Manual for Adjustment Procedure.
	R24	U5 Input Offset.	See Section 5 for non-routine Adjustment Procedure.
	R25	U4 Input Offset.	See Section 5 for non-routine Adjustment Procedure.
	R36	U7 Input Offset.	See Section 5 for non-routine Adjustment Procedure.
	R48	>5 MHz, <5 MHz Detector Balance.	Requires EPROM Reprogramming.
	R56	Adjust U2 Current, Harmonics.	Requires EPROM Reprogramming.
	R58	Adjust U6 Current, Harmonics.	Requires EPROM Reprogramming.
A4A8 Heterodyne Oscillator PCB	C21	RF Bypass Adjustment.	Factory Adjust Only.
	C64	RF Bypass Adjustment.	Factory Adjust Only.
	L7	Phase-shift Adjustment.	Factory Adjust Only.
	L8	Phase-shift Adjustment.	Factory Adjust Only.
	R8	Temperature Compensation Null	Factory Adjust Only.
	R11	Frequency Gain Adjustment.	Factory Adjust Only.

Table 4-6. Printed Circuit Board Adjustment Control (cont)

PRINTED CIRCUIT BOARD	CONTROL	FUNCTION	REFERENCE
	R13	Temperature Compensation Gain Adjustment.	Factory Adjust Only.
	R18	Center Frequency Offset Adjustment.	Factory Adjust Only.
	R75	Loop Bandwidth Adjustment.	Factory Adjust Only.
A4A9 Heterodyne Converter PCB	C11	Matching Capacitor, Q1, Q2.	See Section 5 for non-routine
	C15	Tuning Capacitor.	See Section 5 for non-routine Adjustment Procedure.
	R6	Gain Adjustment, Q1.	See Section 5 for non-routine Adjustment Procedure.
	R42	Gain Adjustment, Q2.	See Section 5 for non-routine Adjustment Procedure.
A4A10 Modulation Distribution PCB	C13 Adjustment.	U26 High Frequency Response, Adjustment Procedure.	See Section 5 for non-routine
	R12	X6.25 (1.25 Scale factor) Gain Adjustment.	See Section 5 for non-routine Adjustment Procedure.
	R13	X4 (0.8 Scale factor) Gain Adjustment.	See Section 5 for non-routine Adjustment Procedure.
	R14	X5 (X1 Scale Factor) Gain Adjustment.	See Section 5 for non-routine Adjustment Procedure.
	R22	AM Calibration.	See Calibration Manual for Adjustment Procedure.
	R31	DCFM Deviation Adjustment.	See Calibration Manual for Adjustment Procedure.
	R33	DCFM Mode: High-Rate, 500 kHz Deviation.	See Calibration Manual for Adjustment Procedure.
	R38	Level DAC.	See Section 5 for non-routine Adjustment Procedure.
	R41	FM DAC Offset Adjustment.	See Section 5 for non-routine Adjustment Procedure.
	R43	Offset Voltage Adjustment, U19 (Equalization Network).	See Section 5 for non-routine Adjustment Procedure.
	R44	+/- Gain Balance, U23.	See Section 5 for non-routine Adjustment Procedure.
	R46	-1 Gain Offset Voltage Adjust, U23.	See Section 5 for non-routine Adjustment Procedure.

Table 4-6. Printed Circuit Board Adjustment Control (cont)

PRINTED CIRCUIT BOARD	CONTROL	FUNCTION	REFERENCE
	R48	DCFM Mode: Low-Rate Deviation Adjustment.	See Section 5 for non-routine Adjustment Procedure.
	R50	1/N DAC Offset Voltage Adjustment, U19.	See Section 5 for non-routine Adjustment Procedure.
	R54	DCFM Buffer Offset Voltage Adjustment, U18.	See Section 5 for non-routine Adjustment Procedure.
	R55	Output Level Calibration.	See Section 5 for non-routine Adjustment Procedure.
	R58	AM DAC Offset Voltage Adjustment, U28.	See Section 5 for non-routine Adjustment Procedure.
	R61	+1 Gain Offset Voltage Adjustment, U23.	See Section 5 for non-routine Adjustment Procedure.
A5A1 Power Supply PCB	No adjustments.		
A5A2 Power Supply Regulator	R1	Frequency Adjustment.	See Calibration Manual for Adjustment Procedure.
	R7	6V Adjust.	See Calibration Manual for Adjustment Procedure.
A5A3 Aux Transformer	No adjustments.		
A5A4 Input Rectifier PCB	No adjustments.		
A5A5 Switching Transistors	No adjustments.		
A5A6 Power Supply Capacitor	No adjustments.		
A6A1 IEEE Connector PCB	No adjustments.		
A6A2 Series Pass Motherboard PCB	No adjustments.		
A6A3 +5 Volt Series-Pass Regulator	No adjustments.		
A6A4 +12V, -12V, +24V Series-Pass Regulator PCB	R5	Voltage Adjust (All Power Supply Voltages).	See Calibration Manual for Adjustment Procedure.
607XA-130 (Option)	COARSE	Coarse Frequency Adjustment.	See Calibration Manual for Adjustment Procedure.
	FINE	Fine Frequency Adjustment.	See Calibration Manual for Adjustment Procedure.

Table 4-7. Printed Circuit Board Switches

ASSEMBLY	SWITCH	FUNCTION
A2A1 Controller	U30	#1 Used to test microprocessor U22 and clock generator U25. #2 Self test bypass switch. #3 Should normally be open (off). #4 Should normally be open (off).
A2A2 Non-Volatile Memory PCB	S1	Battery Standby Switch: Open, Battery out of Circuit (for service and transport); Closed, Battery in Circuit.
A3A1 Phase Detector PCB	SW1	Test position of switch opens main loop and allows manual frequency adjustment via R37.
A3A2 10-MHz Reference PCB	S1	Reference Frequency Selector. Selects internal oscillator or Option -130. If the Synthesizer Module is swung out when serving an instrument with a -130 Option, the 10 MHz reference is disconnected. This switch provides a convenient method of operating the module temporarily on the internal oscillator.
A3A4 N/1	SW1	Input signal Selector Test Switch. Allows the signal from the main loop VCO to be routed directly to the N/1 Divider, thus bypassing the A3A6 SSB Mixer and the A3A7 Sub-Synthesizer modules. this is accomplished by disconnecting cable W36 from J2 of A3A6 and connecting it to J2 of A3A4.

Table 4-8. Replaceable Parts Requiring EPROM Recalibration (A3A3 PCB)

REFERENCE DESIGNATION FOR REPLACEMENT PARTS			
C11	C80	L1	R151
C13	C82	through	T1
C21	CR6	L4	T2
C22	through	L6	T3
C23	CR11	through	U5
C24	CR14	L8	U6
C25	CR15	L18	U23
C53	CR18	through	W2
C63	through	L20	W3
C66	CR21	R6	Delay
C68	CR24	R23	Cable
C70	through	R30	
C71	CR27	R31	
C78		R46	
C79			

4-28. All other components are field replaceable. Careful disassembly and reassembly of this printed circuit board is necessary if calibration is to be maintained.

4-29. A4A6 X2 Output Amplifier PCB Replaceable Parts and Procedure

4-30. There are several components, that if replaced, require reprogramming the level portion of the Calibration EPROM. If these components are replaced the user is urged to return the generator to the nearest John Fluke Service Center. The components are: U9, U20, K3, K4, R43, R44, and R45.

4-31. Replacing any part listed in Table 4-9 requires performing the A4A6 X2 Output Amplifier Service Routine Adjustment first (column G), then performing the other indicated procedures listed in the table.

4-32. A4A7 Output Amplifier PCB, Replaceable Parts and Procedure

4-33. Replacing any component below requires reprogramming the level correction portion of the Calibration EPROM. If these components are replaced, the user is urged to return the generator to the nearest John Fluke Service Center. The components are: U3, U6, K1, K2, R31, R32, and R33.

4-34. Replacement of any part listed in Table 4-10 requires performing the A4A7 Output Amplifier Service Routine Adjustment first (column F) then performing the other procedures indicated in the table.

4-35. A4A8 Heterodyne Oscillator PCB, Replacement Parts and Factory Service Information

4-36. Replacement of any part listed in Table 4-11 will require factory calibration of the A4A8 Heterodyne Oscillator PCB. The user is urged to return the signal generator to the nearest John Fluke Service Center.

Table 4-9. Replaceable Parts and Procedures (A4A6 PCB)

PART REPLACED	PROCEDURES*							PART REPLACED	PROCEDURES*						
	A	B	C	D	E	F	G		A	B	C	D	E	F	G
BPF 1		X		X	X		X	R29	X	X					X
through								R35	X	X					X
BPF 4								R36	X	X					X
C14				X	X		X	R37	X	X					X
C16				X	X		X	R40	X	X					X
C23**						X	X	R42		X		X			X
C33**						X	X	R52	X	X					X
C35						X	X	R53	X	X					X
C74						X	X	R59	X	X					X
C78						X	X	R60	X	X					X
C79						X	X	R61	X	X				X	X
C84	X	X					X	R62	X	X				X	X
C85	X	X					X	R63	X	X				X	X
C86	X	X					X	R64	X	X				X	X
CR6	X	X				X	X	R65	X	X				X	X
CR7	X	X				X	X	R66	X	X				X	X
CR8	X	X				X	X	R68	X	X					X
CR9	X	X				X	X	R69	X	X				X	X
CR10	X	X				X	X	R70	X	X				X	X
CR11	X	X				X	X	R71	X	X				X	X
CR20		X		X	X		X	R73	X	X				X	X
through								R74	X	X				X	X
CR35								R75	X	X				X	X
K1		X	X				X	R84	X	X					X
K2		X	X				X	R89		X		X	X		X
L6	X	X					X	T1				X			X
Q1				X	X		X	U1		X		X			X
Q2				X	X		X	U2	X	X	X	X	X		X
Q4	X	X					X	U3		X		X	X		X
Q5	X	X					X	U6		X	X	X	X		X
Q10						X	X	U7		X		X			X
Q11						X	X	U15	X	X					X
R20	X	X	X	X			X	U16	X	X					X
R21	X	X	X	X			X	U17	X	X					X
R28	X	X					X								

*Procedures:

A. RF OUTPUT LEVEL CHECK in the Calibration Manual.

B. LEVEL FLATNESS CHECK procedure in Section 5

C. GENERATOR SOURCE IMPEDANCE (SWR) CHECK in the Calibration Manual.

D. RF HARMONIC CHECK in the Calibration Manual.

E. X2 OUTPUT AMPLIFIER SUBHARMONIC ADJUSTMENT PROCEDURE procedure in Section 5.

F. AM CHECK in the Calibration Manual.

G. A4A6 X2 OUTPUT AMPL SERVICE ROUTINE ADJUSTMENT in Section 5

**C23, C33: Factory selected value capacitors: replace only with exact replacement value capacitors.

Table 4-10. Replaceable Parts and Procedures (A4A7 PCB)

PART REPLACED	PROCEDURES*						PART REPLACED	PROCEDURES*					
	A	B	C	D	E	F		A	B	C	D	E	F
C11	X	X			X	X	R17	X	X			X	X
C12	X	X				X	R18	X	X			X	X
C15	X	X				X	R19	X	X			X	X
C23					X	X	R20	X	X			X	X
C24					X	X	R23	X	X				X
C25					X	X	R24	X	X				X
C35					X	X	R25	X	X				X
C52**					X	X	R26	X	X			X	X
CR1	X	X			X	X	R27	X	X			X	X
CR2	X	X			X	X	R36	X	X			X	X
CR3	X	X			X	X	R37	X	X			X	X
CR4	X	X			X	X	R42	X	X			X	X
CR5	X	X			X	X	R44	X	X			X	X
CR6	X	X			X	X	R46	X	X			X	X
L6	X	X				X	R47	X	X				X
Q1	X	X				X	R48	X	X				X
Q2	X	X				X	R53	X	X			X	X
Q4					X	X	R55	X	X	X	X		X
Q5					X	X	R56	X	X	X	X		X
R2	X	X				X	R57		X		X		X
R4	X	X				X	R58		X		X		X
R5	X	X				X	U1		X		X		X
R6	X	X				X	U2	X	X	X	X		X
R8	X	X				X	U4	X	X				X
R9	X	X				X	U5	X	X				X
R11	X	X				X	U7	X	X				

*Procedures:
A. RF OUTPUT LEVEL CHECK in the Calibration Manual.
B. LEVEL FLATNESS CHECK procedure in Section 5.
C. GENERATOR SOURCE IMPEDANCE (SWR) CHECK in the Calibration Manual.
D. RF HARMONIC CHECK in the Calibration Manual.
E. AM CHECK in the Calibration Manual.
F. A4A7 OUTPUT AMPLIFIER SERVICE ROUTINE ADJUSTMENT in Section 5.

**C51, C52: Factory selected value capacitors; replace only with exact replacement value capacitors.

Table 4-11. Replacement Parts Requiring Factory Calibration (A4A8 PCB)

C20	C64	L7	RT1 (thermistor)
C21	CR2	L8	U12 (SAW Delay Line)
C49	CR3	Q3	

4-37. 607XA-870 Reverse Power Protection Option (RPP)

4-38. Replacing some of the parts requires reprogramming the level correction portion of the Calibration EPROM. If these parts are replaced, the user is urged to return the signal generator to the nearest John Fluke Service Center. The components that require EPROM recalibration are: C12, C18, CR1 through CR4, CR11 through CR14, and K1.

4-39. All other parts are field replaceable. When any component is replaced the 607XA-870 Reverse Power Protection Option Adjustment procedure should be performed. The procedure is located in Section 7C of the 6070A/6071A Calibration Manual.

Section 5
Non-Routine Adjustments

5-1. INTRODUCTION

5-2. This section contains information on the non-routine adjustments. The procedures given below assume that the 6070A/6071A has been fully factory calibrated and only adjustment of the controls that do not affect the Calibration EPROM is required. Do not adjust the controls indiscriminately.

5-3. ACCESS AND ASSEMBLY IDENTIFICATION

5-4. Access to the major assemblies is described in Section 3, Access Procedures. Section 3 also contains illustrations that identify the location of the major assemblies.

5-5. ADJUSTMENT CONTROLS

5-6. Refer to Table 4-5, Internal Adjustment Controls. This table lists each circuit board and the adjustment controls. Notice that many of the controls require reprogramming of the Calibration EPROM. If these controls need adjusting, the user is urged to return the generator to the nearest John Fluke Service Center. Refer to the Shipping and Service information that is given in Section 2 of the Calibration Manual.

5-7. TEST EQUIPMENT REQUIRED

5-8. Refer to the List of Required Test Equipment located in Section 1 of the Calibration Manual.

5-9. NON-ROUTINE ADJUSTMENT PROCEDURES

5-10. The non-routine adjustment procedures describe adjustment of controls that can be made without affecting the Calibration EPROM. These controls are not described in the Calibration Procedures in the Calibration Manual.

WARNING

HIGH VOLTAGES ARE EXPOSED WHEN PERFORMING MAINTENANCE PROCEDURES ON AND NEAR THE POWER SUPPLY. OBSERVE ALL APPLICABLE SAFETY PRECAUTIONS IF LINE POWER IS CONNECTED TO THE INSTRUMENT.

CAUTION

TO PREVENT COMPONENT DAMAGE, OBSERVE STATIC AWARENESS PRECAUTIONS. REFER TO THE YELLOW INSERT SHEET IN FRONT OF SECTION 4.

5-11. A3A1 Phase Detector PCB

5-12. The non-routine adjustments for the A3A1 Phase Detector PCB are as follows:

R2 Offset Voltage Ajust
R35 Integrator Offset Adjust

PURPOSE: Adjustment of non-routine controls

TEST EQUIPMENT: DMM

REMARKS: The UUT and all test equipment must be at room temperature and must be operating for at least 30 minutes before this procedure is started.

5-13. Complete the following steps to adjust the non-routine adjustment controls:

1. Complete the disassembly portion of the InteriorAccess Procedure (Section 3) to gain access to the A3A1 Phase Detector PCB. Short TP10 to ground.

2. Program the UUT for FM deviation of 999 kHz and press the FM EXT switch. Program the UUT for a frequency of 519 MHz.

3. Connect the DMM low test lead to TP10 (ground) and the high test lead (+) to TP2.

4. Adjust R2 for a DMM indication at TP2 of 0 ±0.1 mV.

5. Connect the DMM high test lead (+) to TP3 and the low test (–) lead to TP13.

6. Adjust R35 for a DMM indication of 0 ±0.5 mV.

7. Disconnect the DMM.

8. Remove power from the UUT and complete the assembly portion of the Interior Access Procedures.

5-14. A3A3 Discriminator

5-15. The following are the non-routine adjustments for the A3A3 Discriminator PCB:

R45 Phase Shifter
R86 Discriminator Zero Adjustment
R146 FET Tracking Adjustment

PURPOSE: Adjustment of non-routine controls

TEST EQUIPMENT: DMM, Power Supply (0 - 5)

REMARKS: The UUT and all test equipment must be at room temperature and must be operating for at least 30 minutes before this procedure is started.

5-16. Complete the following steps to adjust R86, Discriminator Zero Adjustment:

1. Complete the disassembly portion of the Interior Access Procedure (Section 3) to gain access to the A3A3 Discriminator PCB.

2. Program the UUT to approximately 385 MHz as follows:

a. Press SHIFT, FREQ STEP. Frequency step size appears in the FREQUENCY Display (typically, 1.0XXX MHz).

b. Step the UUT RF output frequency as close to 385 MHz as possible.

3. Connect the DMM between TP5 and ground. Set DMM to 100 mV range.

4. Adjust R86 to indicate 0 ±1 mV.

5. Disconnect the DMM from TP5 and ground.

5-17. Complete the following steps to adjust control R45, Phase Shifter Zero Adjustment:

1. Step the UUT frequency from the 385 MHz obtained in the above paragraph as close as possible (but not exceeding) 520 MHz.

2. Connect the DMM between TP2 and ground.

3. Adjust R45 to indicate 0 ±0.1 volts.

4. Disconnect the DMM from TP2 and ground.

5. Complete the assembly portion of the Interior Access Procedures.

5-18. Complete the following steps for the R146 FET Tracking Adjustment. This adjustment must be made when either Q4 FET or Q5 FET are replaced.

1. Disconnect cable W41 from A3A3J1.

2. Connect the 0 - 5 volt power supply between TP4 (+) and chassis ground (–).

3. Connect the DMM positive test lead to pin 1 of Q5 and connect the negative test lead to the junction of R98 and pin 1 of Q4.

4. Set the DMM on 2k ohm scale.

5. Adjust the power supply voltage until the DMM indicates 122 ohms.

6. Set the DMM on 20k ohm scale and connect the DMM positive test lead to pin 4 of Q4.

7. Adjust R146 for an indication of 7.9k ohms on the DMM.

8. Disconnect the DMM and power supply.

9. Reconnect cable W41 to A3A3J1.

10. Complete the assembly portion of the Interior Access Procedures.

5-19. A3A6 Single Sideband Mixer (Control R30)

5-20. The following procedure is the non-routine adjustment of R30 Phase Detector Gain located on the A3A3 Single Sideband Mixer PCB.

PURPOSE: Adjustment of non-routine control

TEST EQUIPMENT: Low Frequency Synthesized Signal Generator, Modulation Analyzer, RMS Voltmeter

REMARKS:

1. This control is used to adjust the FM flatness.

2. The UUT and all test equipment must be at room temperature and must be operating for at least 30 minutes before this procedure is started.

5-21. Complete the following steps to adjust the FM flatness:

1. Complete the disassembly portions of the Interior Access Procedure (Section 3) to gain access to the A3A3 Single Sideband Mixer PCB (SSB Mixer PCB).

2. Set up the equipment as follows:

a. Connect the Low Frequency Synthesized Signal Generator output to the UUT MOD IN connector through a BNC tee. Connect the RMS Voltmeter input to the other arm of the BNC tee.

b. Connect the UUT RF OUTPUT connector to the Modulation Analyzer input.

c. Set the RMS Voltmeter dB/VOLTS control to the VOLTS position.

d. Program the Modulation Analyzer to AUTO, FM, 50 Hz HP Filter, and PEAK +.

e. Program the Low Frequency Synthesized Signal Generator for an output of 10 kHz at a level of 707.1 mV as measured on the RMS Voltmeter.

3. Program the UUT to RECAL 96 and turn on EXT FM.

4. Program a new frequency step size as follows:

a. Press SHIFT, FREQ STEP. Frequency step size appears in the FREQUENCY Display (typically, 1.0XXX MHz).

b. Program a new frequency step size that is equal to four times the value displayed in step a.

5. Step up the UUT RF output frequency as close to 385 MHz as possible.

6. Edit the modulation deviation on the UUT for a deviation as close to 100.0 kHz as possible as indicated on the Modulation Analyzer.

7. Record the Modulation Analyzer deviation indication.

8. Adjust the frequency of the Low Frequency Synthesized Signal Generator to kHz.

9. Adjust R30 on the SSB Mixer for a reading of 2 kHz larger (approximately 102 kHz) than that recorded in step 7.

10. Disconnect the test instruments.

11. Remove power from the UUT and complete the assembly portion of the Interior Access Procedures.

5-22. A3A6 Single Sideband Mixer (Controls R51 and R52)

5-23. The following are two of the three non-routine adjustments for the A3A6 Single Sideband Mixer PCB:

R51 Lower Frequency Limit
R52 Upper Frequency Limit

PURPOSE: Adjustment of non-routine controls

TEST EQUIPMENT: Frequency Counter

REMARKS:

1. These two adjustments set the frequency limits of the A3A6 Single Sideband Mixer VCO (Clean-up Loop VCO) to prevent the frequency from going into regions of unstable operation.

2. The UUT and all test equipment must be at room temperature and must be operating for at least 30 minutes before this procedure is started.

5-24. Complete the following steps to set the frequency limits of the Single Sideband Mixer VCO:

1. Complete the disassembly portions of the Interior Access Procedure (Section 3) to gain access to the A3A6 Single Sideband Mixer VCO PCB (SSB Mixer PCB).

2. Program the UUT to recall memory location 98 (standard power-on setup).

3. If the UUT has the 607XA-130 Oven Reference Option installed, place SW1 on the A3A2 Nonvolatile Memory PCB in the INT X.0. position.

4. Disconnect cable W38 from the A3A10 VCO Resonator PCB J2.

5. Connect the counter (channel C) to the A3A10 VCO Resonator PCB J2.

6. Set the UUT POWER switch to STBY.

7. Remove U4. (This will cause the SSB Mixer VCO to be driven to the low-frequency limit.)

8. Set the UUT POWER switch to ON.

9. Adjust R51 for a counter reading of 230 MHz.

10. Set the UUT POWER switch to STBY.

11. Replace U4.

12. Set the UUT POWER switch to ON.

13. Disconnect cable W39 from the A3A10 VCO Resonator PCB J1. (This causes the VCO to tune to the high frequency limit.)

14. Adjust R52 for a counter reading of 535 MHz.

15. Disconnect the frequency counter.

16. Reconnect cables W39 and W38 and reset switch SW1.

17. Remove power from the UUT and complete the assembly portion of the Interior Access Procedures.

5-25. A3A7 Sub-Synthesizer PCB

5-26. The following is the non-routine adjustment of L5 VCO Frequency Adjust located on the A3A7 Sub-Synthesizer PCB.

PURPOSE: Adjustment of non-routine control

TEST EQUIPMENT: DMM, Frequency Counter

REMARKS: The UUT and all test equipment must be at room temperature and must be operating for at least 30 minutes before this procedure is started.

5-27. Complete the following steps to adjust L5 VCO Frequency Adjust:

1. Complete the disassembly portions of the Interior Access Procedure (Section 3) to gain access to the A3A7 Sub-Synthesizer PCB.

2. Connect the Frequency Counter to J2 located on the A3A7 PCB.

3. Program the UUT for an RF frequency of 250.201 MHz and verify that the frequency counter indicates 804.000 kHz.

4. Press REL FREQ pushbutton switch (control lighted).

5. Connect the DMM between TP8 and TP16 (ground).

6. Adjust L5 for 2.5 ±0.1 volts as indicated on the DMM. Install locking nut on L5.

7. Measure voltage on the DMM to three decimal places and record as voltage 1.

8. Program the UUT for a frequency step size of 10 KHz.

9. Increment the UUT by 10 kHz. Observe that the frequency counter indication is incremented by 40 kHz.

10. Measure voltage on the DMM to three decimal places and record as voltage 2.

11. Continue incrementing the UUT by 10 kHz to 90 kHz and observe that the frequency counter indication changes by 40 kHz/step.

12. As indicated in Table 5-1, increment each remaining frequency step (0 through 9 steps) observing the Frequency Counter Indication for each step.

Table 5-1. Frequency Steps

FREQ STEP (UUT)	FREQUENCY COUNTER INDICATION (FREQUENCY/STEPS)
1 kHz/steps	4 kHz/step
100 Hz/steps	400 Hz/step
10 Hz/steps	40 Hz/step
1 Hz/steps	4 Hz/step

13. At this point the UUT FREQUENCY display should indicate 250.300999. The voltage indication

on the DMM connected to TP8 should be less than 9.5 volts.

14. Record the DMM voltage indication to three decimal places as voltage 3.

15. If the voltage at TP8 is greater than 9.5 volts, readjust L5 to 9.5 volts.

16. If L5 is readjusted, perform the precedures in steps 6 through 14 and record the new voltages.

17. Decrement the UUT by 1 kHz and record the voltage at TP8 to three decimal places as voltage 4.

18. The ratio (V4-V3)/V2-V1) must be less than 1.5.

19. Disconnect the test instruments.

20. Remove power from the UUT and complete the assembly portion of the Interior Access Procedures.

5-28. A3A9 Synthesizer Distribution PCB

5-29. The following are the non-routine adjustments for the A3A9 Synthesizer Distribution PCB:

C9 High Frequency Compensation
R8 KV DAC (U8) Offset Adjustment

PURPOSE: Adjustment of non-routine controls

TEST EQUIPMENT: DMM, Low Frequency Synthesized Signal Generator, RMS Voltmeter

REMARKS: The UUT and all test equipment must be at room temperature and must be operating for at least 30 minutes before this procedure is started.

5-30. Complete the following steps to adjust the non-routine adjustment controls:

1. Complete the disassembly portion of the Interior Access Procedure (Section 3) to gain access to the A3A9 Synthesizer Distribution PCB.

2. Short J16 to ground.

3. Connect a DMM to P3-11.

4. Program the UUT to 519.9 MHz, FM deviation 999 kHz, Shift 21 (High Deviation Mode), EXT FM.

5. Adjust R8 for 0 ±0.5 mV.

6. Disconnect the short from J16.

7. Connect the Low Frequency Synthesized Signal Generator to J16, set the frequency to 1 kHz, and set the level to 176.8 mV terminated.

8. Connect the RMS Voltmeter to P3-11 and adjust the voltmeter for dB relative setting.

9. Set the Low Frequency Synthesized Signal Generator to 500 kHz frequency. Adjust C9 for an RMS Voltmeter indication of –3.01 ±0.1 dB.

10. Disconnect the test instruments.

11. Remove power from the UUT and complete the assembly portion of the Interior Access Procedures.

5-31. A4A2 Modulation Oscillator PCB

5-32. The following are the non-routine adjustments for the A4A2 Modulation Oscillator PCB:

R13 FET Bias Adjustment
R23 Offset Voltage Adjustment
R27 Bias Current Compensation Adjust

PURPOSE: Adjustment of non-routine controls

TEST EQUIPMENT: DMM

REMARKS: The UUT and all test equipment must be at room temperature and must beoperating for at least 30 minutes before this procedure is started.

5-33. Complete the following steps to adjust the non-routine adjustment controls:

1. Complete the disassembly portion of the Interior Access Procedure (Section 3) to gain access to the A4A2 Modulation Oscillator PCB.

2. Program the UUT to a modulation frequency of 10 kHz. Program in SHIFT 31 to enable fixed range.

3. Using the rotary knob, edit the modulation frequency up to 25.5 kHz.

4. Connect the DMM to TP1 on the A4A2 Modulation Oscillator PCB with a 1 μF capacitor across the DMM leads.

5. Adjust R23 for 0 ±0.1 mV as indicated on the DMM.

6. Using a rotary knob, edit modulation frequency to 1.0 kHz and adjust R27 for 0 ±0.5 mV.

7. Using the filter, connect the DMM to TP2.

8. Adjust R29 for 0 ±0.5 mV as indicated on the DMM.

9. Repeat steps 4 through 8 until the voltage is 0 ±1 mV at the rotary knob settings of 25.5 kHz, and 1 kHz at TP1 and TP2.

10. Program in SHIFT 30 to disable fixed range.

11. Program the UUT to 21 kHz modulation frequency.

12. Connect the DMM to TP5 and adjust R13 for −1.5 ±0.01 volts.

5-34. A4A4 Modulator Divider PCB

5-35. The following are the non-routine adjustments for the A4A4 Modulator Divider PCB:

R24 Modulator Gain Adjust (U18)
R26 Modulator Gain Adjust (U10)
R28 Modulator Gain Adjust (U8)
R30 Modulator Gain Adjust (U12)
R32 Modulator Gain Adjust (U5)
R39 Modulator Gain Adjust (Q3)
R47 Modulator Gain Adjust (Q4)

PURPOSE: Adjustment of modulator bias controls for proper operation after modulator replacement

TEST EQUIPMENT: Power Meter with power sensor, 10 dB attenuator, DMM

REMARKS:

1. The ALC loop gain and bandwidth is optimized in the factory for each RF frequency band by the adjustment of modulator bias controls R26, R28, R32, R39, R47, R24, and by the selection of resistors, R3, R4, R5, R6, R9, R8, R7, respectively. This optimization requires test equipment that is not commercially available and is consequently not given here. This procedure can be used to adjust the modulator bias control for proper operation if a modulator PCB is replaced and should not be used as a routine calibration procedure. ALC gain control R88 is a factory sealed adjustment to correct the ALC loop for detector efficiency and total RF gain. ALC gain control R88 does not require adjustment unless the detector or RF amplifiers are replaced, which will necessitate factory recalibration of the correction EPROM.

2. The UUT and all test equipment must be at room temperature and must be operating for at least 30 minutes before this procedure is started.

5-36. Complete the following steps to adjust the modulator bias for proper operation after modulator replacement:

1. Complete the disassembly portion of the Interior Access Procedure (Section 3) to gain access to the A4A4 Modulator Divider PCB.

2. Verify the input to A4A4J13 from A3A3J10.

3. Apply power to the UUT.

4. Program the UUT to RECALL 98 and the frequency to 500 MHz.

5. Connect the power meter with the 10-dB pad to output connector A4A4J3. (The output connector A4A4J3 is found in the A4A7 Output Amplifier Compartment or in the A4A6 Times Two Output Amplifier compartment in the 6071A.)

6. Verify the voltage from A4A4P3 to ground is −10V ±2V.

7. Verify the voltage from TP1 to ground is +17.2V ±0.7V. Connect the DMM to TP1.

8. Connect the DMM test leads: high to TP1 and low to TP2. (This monitors the modulator current at 10 mV/mA.)

9. Determine from Table 5-2 the correct modulator bias control and programthe UUT to the indicated frequency according to the Frequency Band or modulator reference designator to be readjusted.

10. Adjust the appropriate bias control for a maximum indication on the power meter but do not allow the DMM reading to exceed 0.55V DC.

Table 5-2. Modulator Bias Control Adjustments

BAND FREQ	MODULATOR	PROGRAM FREQUENCY	MODULATOR BIAS CONTROL
A	U10	500 MHz	R26
B	U4	300 MHz	R28
C	U12	200 MHz	R30
D	U5	150 MHz	R32
E	Q3	100 MHz	R39
F	Q2	75 MHz	R47
G	U18	50 MHz	R24

NOTE

There should be no indication on the DMM in the 'G' Band, Modulator U18, Control R24.

11. Disconnect the power meter and the DMM.

12. Remove power from the UUT and complete the assembly portion of the Interior Access Procedures.

5-37. A4A6 X2 Output Amplifier Service Routine Adjustment

PURPOSE: Service Routine of the A4A6 Output Amplifier after replacement of any part listed in Table 4-9.

TEST EQUIPMENT: Calibrated 10-dB Attenuator, DMM, Power Meter, RMS Voltmeter, Spectrum Analyzer

REMARKS:

1. The Service Routine Adjustment consists of the following sequential procedures.

   a. Detector/Leveling Loop Offset Balance

   b. Unleveled Indicator Check

   c. U2 and U9 Amplifier Current Adjust and Harmonic Check

2. The UUT and all test equipment must be at room temperature and must be operating for at least 30 minutes before this procedure is started.

5-38. Perform the Detector/Leveling Loop Offset and Balance Adjustment as follows:

1. Complete the disassembly portion of the Interior Access Procedure (Section 3) to gain access to the A4A6 X2 Output Amplifier PCB.

2. Program the UUT front panel to 5 MHz, +10 dBm. Press the RF OUTPUT ON/off switch to off (control light off).

3. Set the DMM to DC volts, autoranging. Short the test leads together and zero the meter. Connect the DMM high lead to TP1 and the low lead to TP2.Adjust R53 for an indication of –20 ±20 microvolts.

4. Connect the DMM high lead to TP3 and the lo lead to TP4. Adjust R60 for a indication of 0 ±20 microvolts.

5. Press the RF OUTPUT ON/off switch to ON (control light on). Verify that the Level UNCAL annunciator on the front panel is not on or flashing.

6. Connect the DMM high lead to TP6 and the low lead to TP5. Adjust R75 for an indication of 0 ±20 microvolts.

7. Connect the DMM high lead to TP3 and the low lead to TP2. Press the RF OUTPUT ON/off switch to off (control off).

8. Adjust R29 for an indication of 0 ±60 microvolts.

9. Program the UUT to 4.999 MHz and note the DMM indication.

10. Program the UUT to 5 MHz and adjust R29 for a reading of one fourth the magnitude and the same polarity as the indication noted in step 8.

11. Program the UUT to 4.999 MHz and adjust R37 for an indication on the DMM of 0 ±60 microvolts.

12. Program the UUT to 5 MHz and adjust R29 for an indication on the DMM of 0 ±60 microvolts.

13. Program the UUT to 4.999 MHz and check that the DMM indicates 0 ±60 microvolts. If not, repeat steps k, l, and m until the DMM indicates 0 ±60 microvolts with either frequency programmed.

14. Program the UUT to 5 MHz, and set the level to +10 dBM. Press the RF OUTPUT ON/off switch to ON (indicator light off).

15. Connect the RMS Voltmeter with a 50-ohm termination to the RF OUTPUT connector.

16. Set the RMS Voltmeter to Relative mode.

17. Program the UUT to 4.999 MHz. Note the RMS Voltmeter indication.

18. Adjust R35 for an RMS Voltmeter indication of one-half the reading noted in step 17.

19. Repeat steps 6 through 18 until the DMM reading change is 0 ±60 μV and the RMS Voltmeter reading changes <0.05 dB.

20. Remove the DMM and proceed to the Unleveled Indicator Check.

5-39. Perform the Unleveled Indicator Check as follows:

1. Program the UUT to 5 MHz, and set the level to 0 dBm.

2. Press the RF OUTPUT ON/off switch to ON (indicator on). Note the AMPLITUDE UNCAL annunciator is not flashing.

3. Connect the DMM high lead to TP8 and the low lead to ground. The DMM should indicate a TTL low (<0.8V DC).

4. Disconnect P3. Observe that the AMPLITUDE UNCAL annunciator flashes and that the DMM indicates a TTL high (>3V DC).

5. Remove the DMM, reconnect P3, and proceed to the U2 and U9 Amplifier Current Adjust and Harmonic Check.

5-40. Perform the U2 and U9 Amplifier Current Adjust and Harmonic Check as follows:

1. Set the Power Meter to +20 dBm range and connect the Power Meter to the RF OUTPUT connector.

2. Program the UUT to 519.9 MHz, +13 dBm, Shift 81, Shift 31.

3. Edit the 0.1 dB digit until the level on the Power Meter no longer increases. The output level must be greater than +15 dBm.

4. Edit the level down to +13 dBm on the Power Meter. Disconnect the Power Meter, and connect the Spectrum Analyzer. Harmonics must be at least -35 dBm. Adjust R20 to minimize harmonics if necessary.

5. Disconnect the Spectrum Analyzer and reconnect the power meter through a 10 dB pad.

6. Program the UUT to 20.9 dBm. The Power Meter indication should be at least +10 dBm. Edit the level down to +9 dBm indication on the Power Meter.

7. Disconnect the Power Meter and connect the Spectrum Analyzer.

8. Set the Spectrum Analyzer to +30 dBm. Harmonics should be at least -25 dBc (dB below the carrier) without the RPP (607XA-870 Reverse Power Protection), or harmonics should be at least -20 dBc with the RPP.

9. Disconnect the test instruments.

10. Remove power from the UUT and complete the assembly portion of the Interior Access Procedures.

5-41. A4A6 X2 Output Amplifier Subharmonic Adjustment Procedure

PURPOSE: To adjust subharmonic output of the A4A6 X2 Output Amplifier

TEST EQUIPMENT: Spectrum Analyzer

REMARKS: The UUT and all test equipment must be at room temperature and must be operating for at least 30 minutes before this procedure is started.

5-42. Complete the following steps to perform the Subharmonic Adjustment Procedure:

1. Complete the disassembly portion of the Interior Access Procedure (Section 3) to gain access to the A4A6 X2 Output Amplifier PCB.

2. Program the UUT to 520 MHz at a level of +7 dBm.

3. Connect the Spectrum Analyzer to the RF OUTPUT connector.

4. Set the Spectrum Analyzer to +10 dBm full scale and set to full scan sweep.

5. While observing harmonically related products at F/2 and 3F/2, edit the frequency at the UUT in 1-MHz steps from 520 MHz to 1040 MHz.

6. Verify that F/2 and 3F/2 should never exceed -35 dBc. If necessary, adjust R91 (accessible through the cover hole) to reduce F/2 or 3F/2.

7. Disconnect the test equipment from the UUT.

8. Remove power from the UUT and complete the assembly portion of the Interior Access Procedure.

5-43. A4A6 S2 Output Amplifier Level Flatness Check and A4A7 Output Amplifier Level Flatness Check

PURPOSE: To check the Output Amplifier for signal level flatness

TEST EQUIPMENT: Calibrated 10 dB Attenuator, Calibrated Power Senser, Power Meter

REMARKS:

1. The first six steps apply to Models 6070A and 6071A. The remaining steps apply to Model 6071A only. The A4A7 PCB is located in Model 6070A, and the A4A6 PCB is located in Model 6071A.

2. The UUT and all test equipment must be at room temperature and must be operating for at least 30 minutes before this procedure is started.

5-44. Complete the following steps to perform the Level Flatness Check (6070A/6071A):

1. Program the UUT to 4.9 MHz at a level of +8 dBm.

2. Connect the Power Meter with the Calibrated Power Sensor through a 10-dB Attenuator to the UUT RF OUTPUT.

3. Edit the frequency in 1 MHz steps from 4.9 MHz to 519.9 MHz. The maximum allowable peak-to-peak variation is ±0.4 dB.

4. Program the UUT to 4.9 MHz and +14 dBm.

5. Edit the frequency in 1-MHz steps from 4.9 MHz to 519.9 MHz. The maximum allowable peak-to-peak variation is ±0.8 dB.

6. If the UUT is a Model 6070A Synthesized RF Signal Generator, disconnect the test instruments. Remove power from the UUT (6070A) and complete the assembly portion of the Interior Access Procedures.

7. Proceed with the following steps if the UUT is a Model 6071A Synthesized RF Signal Generator.

8. Program the UUT to 520 MHz and +6 dBm.

9. Edit the frequency in 1-MHz steps from 520 MHz to 1040 MHz. The maximum allowable variation is ±0.8 dB.

10. Program the UUT to 520 MHz at a level of +7 dBm.

11. Edit the frequency in 1 MHz steps from 520 MHz to 1040 MHz. The maximum allowable variation is ±10 dB.

12. Disconnect the test instruments.

13. Complete the assembly portion of the Interior Access Procedures.

5-45. A4A7 Output Amplifier Service Routine Adjustment

PURPOSE: Service Routine of A4A7 Output Amplifier after replacement of any part listed in Table 4-10.

TEST EQUIPMENT: Calibrated 10-dB Attenuator, DMM, Power Meter, RMS Voltmeter, Spectrum Analyzer

REMARKS:

1. The Service Routine Adjustment consists of the following sequential procedures:

   a. Detector/Leveling Loop Offset Balance.

   b. Unleveled Indicator Check.

   c. U2 and U6 Amplifier Current Adjust and Harmonic Check.

2. The UUT and all test equipment must be at room temperature and must be operating for at least 30 minutes before this procedure is started.

5-46. Perform the Detector/Leveling Loop Offset and Balance Adjustment as follows:

1. Complete the disassembly portion of the Interior Access Procedure (Section 3) to gain access the A4A7 Output Amplifier PCB.

2. Program the UUT to 5 MHz, +10 dBm. Press the RF OUTPUT ON/off switch to off (control light off).

3. Set the DMM to DC volts, autoranging. Short the test leads together and zero the meter. Connect the DMM high lead to TP1 and the low lead to TP2. Adjust R9 for an indication of –20 ±20 microvolts.

4. Connect the DMM high lead to TP3 and the low lead to TP4. Adjust R24 for an indication of 20 ±20 microvolts.

5. Press the RF OUTPUT ON/off switch to ON (control light on). Verify that the Level UNCAL annunciator on the front panel is not on or flashing.

6. Connect the DMM high lead to TP6 and the low lead to TP5. Adjust R36 for an indication of 0 ±20 microvolts.

7. Connect the DMM high lead to TP3 and the low lead to TP2. Press the RF OUTPUT ON/off switch to off (control light off).

8. Adjust R4 for an indication of 0 ±60 microvolts.

9. Program the UUT to 4.999 MHz and note the DMM indication.

10. Program the UUT to 5 MHz and adjust R4 for a reading of one-fourth the magnitude and the same polarity as the indication noted in stwp 9.

11. Program the UUT to 4.999 MHz and adjust R6 for an indication on the DMM of 0 ±60 microvolts.

12. Program the UUT to 5 MHz and adjust R4 for an indication on the DMM of 0 ±60 microvolts.

13. Program the UUT to 4.999 MHz and check that the DMM indicates 0 ±60 microvolts. If it does not, repeat steps 11, 12, and 13 until the DMM indicates 0 ±60 microvolts with either frequency programmed.

14. Program the UUT to 5 MHz, level to 10 +10 dBm. Press RF OUTPUT ON/offswitch to ON (control light on).

15. Connect the RMS Voltmeter with a 50-ohm termination to the RF OUTPUT connector.

16. Set the RMS Voltmeter to Relative mode.

17. Program the UUT to 4.999 MHz. Note the RMS Voltmeter measurement.

18. Adjust R48 for an RMS Voltmeter indication of one-half the measurement noted in step 17.

19. Repeat steps 7 through 18 until the DMM measurement change is 0 ±60 uV and the RMS Voltmeter measurement changes <0.05 dB.

20. Remove the DMM and proceed to the Unleveled Indicator Check.

5-47. Perform the Unleveled Indicator Check as follows:

1. Program the UUT to 5 MHz at a level of 0 dBm.

2. Press the RF OUTPUT ON/off switch to ON (indicator light on). Note the AMPLITUDE UNCAL annunciator is not flashing.

3. Connect the DMM high lead to TP8 and the low lead to ground. The DMM should indicate a TTL low (<0.8V DC).

4. Disconnect P3. Observe that the AMPLITUDE UNCAL annunciator flashes and that the DMM indicates a TTL high (>30V DC).

5. Remove the DMM, reconnect P3, and proceed to the U2 and U6 Amplifier Current Adjust and Harmonic Check.

5-48. Perform the U2 and the U6 Amplifier Current Adjust and Harmonic Check as follows:

1. Set the Power Meter to +20 dBm range and connect the Power Meter to the RF OUTPUT connector.

2. Program the UUT to 519.9 MHz, +13 dBm, Shift 81, Shift 31.

3. Edit the 0.1 dB digit until the level on the Power Meter no longer increases. Output level must be greater than +15 dBm.

4. Edit the level back down to +13 dBm on the Power Meter. Disconnect the Power Meter and connect the Spectrum Analyzer. Harmonics must be at least –35 dBm. Adjust R20 to minimize harmonics if necessary.

5. Disconnect the Spectrum Analyzer and reconnect the Power Meter through a 10 dB pad.

6. Program the UUT to 20.9 dBm. The Power Meter indication should be atleast +10 dBm. Edit the level down to +9 dBm indication on the Power Meter.

7. Disconnect the Power Meter and connect the Spectrum Analyzer.

8. Set the Spectrum Analyzer to +30 dBm. Harmonics should be at least -35 dB below the carrier without the RPP (607XA-870 Reverse Power Protection) or harmonics should be at least -25 dB below the carrier with the RPP. Adjust R57 if necessary.

9. Disconnect the test instruments.

10. Remove power from the UUT and complete the assembly portion of the Interior Access Procedures.

5-49. A4A9 Heterodyne Converter PCB

5-50. The following are the non-routine adjustments for the A4A9 Heterodyne Converter PCB:

C22 Matching Capacitor
C15 Tuning Capacitor
R6 Gain Adjustment (Q1)
R42 Gain Adjustment (Q2)

PURPOSE: To perform tuning and gain adjustment of bandpass amplifiers Q1 and Q2 to optimize the local oscillator input level to mixer U2.

TEST EQUIPMENT: Power Meter with Power Sensor, Calibrated 10 dB Attenuator, DMM, Frequency Counter.

REMARKS:

1. This procedure is only necessary if Q1 or Q2 have been replaced or if any adjustment has been altered.

2. The UUT and all test equipment must be at room temperature and must be operating for at least 30 minutes before this procedure is started.

5-51. Complete the following steps to perform tuning and gain adjustments of bandpass amplifiers Q1.and Q2:

1. Complete the disassembly portions of the Interior Access Procedure (Section 3) to gain access to the A4A9 Heterodyne Converter PCB.

2. The A4A9 Heterodyne Converter PCB must be mounted in the A4 Output Plateand the signal supplied from the A4A8 Heterodyne Oscillator PCB must be connected to the input at A4A9P1. If the input signal is to come from another source, a DC block must be used.

3. Verify that the input to A4A9P1 is 520.000 MHz at a level of +7 ±2 dBm.

4. Program the UUT to: Recal 98, Frequency 50 MHz.

5. Lift one end of R19 from the socket (the end away from the junction of R17, R18, and R19) amd connect it to the socket leading to TP4.

6. Connect the Power Meter, with the 10-dB Pad, to TP4 with a short (<6 inch) cable. Set potentiometers R6 and R42 to maximum counterclockwise.

7. Connect the DMM between TP2 to ground (TP5).

8. Energize the power supply observing the voltage on the DMM connected to TP2. The indication should be 17.2V ±9.7 volts.

9. Connect the DMM positive lead to TP2 and the negative lead to TP1.

10. Adjust R6 for a reading of 0.3 volts (30 mA bias in Q2).

11. Disconnect the DMM negative lead from TP1 and connect to TP3.

12. Adjust R42 for a reading of 0.4 volts (40 mA bias in Q1).

13. Adjust C11, C15, R6, and R42 for a maximum indication on the power meter.

NOTE

These adjustments are interactive so they will have to be adjusted such that voltmeter reading remains less than 0.55 volts (55 mA maximum bias in Q1). A metallic tuning toll has enough capacitance to cause some detuning of C11. Use care in making this adjustment.

14. When all adjustment are optimized, the power neter should indicate +17 dBm, and voltages between TP2 to TP1 and TP2 to TP3 must be less than 0.55 volts.

15. If necessary, adjust R6 for a power meter indication +14 dBm to +17 dBm. The minimum allowable indication is +14 dBm.

16. If a significant change is made in the setting of R6, readjust C11, C15, and R42 for a maximum indication on the power meter and recheck the voltage between TP2 to TP1 and TP2 to TP3.

17. Disconnect the test instruments.

18. Remove power from the UUT and reconnect R19 to the normalconfiguration.

19. Complete the assembly portion of the Interior Access Procedures.

5-52. A4A10 Modulation Distribution PCB

5-53. The following are the non-routine adjustments for the A4A10 Modulation Distribution PCB.

C13	High Frequency Response, Adjustment, U26
R12	X6.25 (1.25 Scale Factor) Gain Adjustment
R14	X4 (0.8 Scale Factor) Gain Adjustment
R13	X5 (X1 Scale Factor) Gain Adjustment
R38	Level DAC Adjustment
R41	FM DAC Offset Adjustment
R43	Offset Voltage Adjustment (U19)
R44	± Gain Balance (U23)
R46	–1 Gain Offset Voltage Adjustment (U23)
R50	1/N DAC Offset Voltage Adjustment (U19)
R54	DCFM Buffer Offset Voltage Adjustment (U18)
R58	AMDAC Offset Voltage Adjustment (U28)
R61	+1 Gain Offset Voltage Adjustment (U23)

PURPOSE: Adjustment of non-routine controls

TEST EQUIPMENT: DMM, Low Frequency Synthesized Generator, RMS Voltmeter, Modulation Analyzer

REMARKS:

1. There are three categories of adjustment procedures:

   a. AC Adjustments

   b. DC Adjustments

   c. AM Adjustments

2. All test equipment must be at room temperature and must be operaing for at least 30 minutes before this procedure is started.

3. The UUT must be warmed up for a minimum of two hours with all covers in place before this procedure is started.

5-54. AC ADJUSTMENTS

1. Complete the disassembly portion of the Interior Access Procedure (Section 3) to gain access the A4A10 Modulation Distribution PCB.

2. Set up the equipment as follows:

   a. Connect the Low Frequency Synthesized Signal Generator output to the UUT MOD IN connector through a BNC tee. Connect the RMS Voltmeter input to the other arm of the BNC tee.

   b. Set the RMS Voltmeter dB/Volts control to the Volts position.

   c. Program the Low Frequency Synthesizer Signal Generator for an output of 1 kHz at a level of 707.1 mV rms as measured on the RMS Voltmeter.

   d. Program the UUT for an RF output frequency of 100 MHz, a level of +7 dBm, and an FM deviation of 49.9 kHz. Turn on the EXT FM/ØM and disable the DC COUPLED controls.

3. Connect the DMM positive lead to TP7 and connect the negative lead to ground. Adjust R14 for 2.69V rms.

4. Program the UUT for an RF output frequency of 300 MHz, a level of +7 dBm, and an FM deviation of 49.9 kHz. Adjust R13 for 3.36V rms.

5. Program the UUT for an RF output frequency of 50 MHz, a level of +7 dBm, and an FM deviation of 49.9 kHz. Adjust R44 for 3.36V rms.

6. Program the UUT for an RF output frequency of 800 MHz, a level of +7 dBm, and an FM deviation of 199.9 kHz. Adjust R12 for 4.20V rms.

7. Program the UUT for an RF output frequency of 300 MHz, a level of +7 dBm, and an FM deviation of 49.9 kHz. Enable fixed range (Shift 31) and with rotary knob dial FM deviation to 5.0 kHz.

8. Program the Low Frequency Synthesized Signal Generator for an output of 500 kHz. Adjust C13 for 0.270 mV rms.

9. Remove the Low Frequency Synthesized Signal Generator and the DMM.

5-55. DC ADJUSTMENTS

1. Connect the DMM positive lead to TP5 and the negative lead to anode of CR8.

2. Program the UUT for an RF output frequency of 250 Mhz, a level of +7 dBm, and an FM deviation of 0.0 Hz. Turn on the EXT FM/ØM.

3. Adjust R41 for 0 ±0.1 mV.

4. Connect the DMM positive lead to TP7 and the negative lead to anode of CR8. Adjust R46 for 0 ±1 mV.

5. Program the UUT for an RF output frequency of 50 MHz, a level of +7 dBm, and an FM deviation of 0 Hz. Verify that EXT FM/ØM is enabled (indicator light on).

6. Adjust R61 for 0 ±1 mV.

7. Connect the DMM postive lead to TP8 and the negative lead to anode of CR8. Adjust R43 for 0 ±1 mV.

8. Program the UUT for an RF output frequency of 250 MHz, a level of +7 dBm, and an FM deviation of 0 Hz. Verify that EXT FM/ØM is enabled (indicator light on). Program DCFM (Shift 11).

9. Connect the DMM positive lead to TP9 and the negative lead to the anode of CR8. Adjust R50 for 0 ±1 mV.

10. Program the UUT for an RF output frequency of 519 MHz, a level of +7 dBm, and an FM deviation of 499 kHz. Verify that EXT FM/ØM is enabled.Program DCFM off (Shift 10).

11. Connect the DMM positive lead to TP11 and the negative lead to the anode of CR8. Adjust R54 for 0 ±1 mV.

5-56. AM ADJUSTMENTS

1. Program the UUT to EXT AM, a level of +6 dBm, and AM deviation of 0 percent.

2. Enable Fixed Range (Shift 31) Edit Level, and rotate the knob counterclockwise for minimum level indication.

3. Connect the DMM positive lead to the cathode of CR3 and connect the negative lead to the anode of CR8.

4. Adjust R58 for 0 ±0.1 mV.

5. Connect the DMM positive lead to TP10 and connect the negative lead to the anode of CR8.

6. Adjust R38 for 0 ±0.1 mV.

7. Disconnect the test instruments.

8. Remove power from the UUT and complete the assembly portion of the Interior Access Procedures.

Section 6
List of Replaceable Parts

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6-1. INTRODUCTION

6-2. This section contains an illustrated parts breakdown of the instrument. A similiar parts list is included in the Options and Accessories Section for each of the options. Components are listed alphanumerically by assembly. Both electrical and mechanical components are listed by reference designation. Each listed part is shown in an accompanying illustration.

6-3. Parts lists include the following information:

1. Reference Designation.
2. Description of Each Part.
3. FLUKE Stock Number.
4. Federal Supply Code for Manufacturers.
5. Manufacturer's Part Number.
6. Total Quantity of Components Per Assembly.
7. Recommended quantity: This entry indicates the recommended number of spare parts necessary to support one to five instruments for a period of 2 years. This list presumes an availability of common electronic parts at the maintenance site. For maintenance for 1 year or more at an isolated site, it is recommended that at least one of each assembly in the instrument be stocked. In the case of optional subassemblies, plug-ins, etc., that are not always part of the instrument or are deviations from the basic instrument model, the REC QTY column lists the recommended spares quantity for the items in that particular assembly.

6-4. HOW TO OBTAIN PARTS

6-5. Components may be ordered directly from the manufacturer's part number, or from the John Fluke Mfg. Co., Inc. or an authorized representative by using the FLUKE STOCK NUMBER. In the event the part ordered has been replaces by a new or improved part, the replacement will be accompanied by an explanatory note and installation instructions if necessary.

6-6. To ensure prompt and efficient handling of your order, include the following information.

1. Quantity.
2. FLUKE Stock Number.
3. Description.
4. Reference Designation.
5. Printed Circuit Board Part Number and Revision Letter.
6. Instrument Model and Serial Number.

6-7. A Recommended Spare Parts Kit for your basic instrument is available from the factory. This kit contains those items listed in the REC QTY column for the parts lists in the quantities recommended.

6-8. Parts price information is available from the John Fluke Mfg. Co., Inc. or its representative. Prices are also available in a Fluke Replacement Parts Catalog, which is available upon request.

CAUTION

Indicated devices are subject to damage by static discharge.

Table 6-1. 6070A/6071A Final Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
	SIGNAL GENERATOR FINAL ASSEMBLY FIGURE 6-1 (6070A/6071A-T&B, 5001)	6070A	AND	6071A			1
A1/A2	FRONT PANEL AND CONTROLLER ASSEMBLY				1		
	(6070A)	531129	89536	531129			
	(6071A)	546226	89536	546226			
A3Ⓧ	SYNTHESIZER MODULE ASSEMBLY	497198	89536	497198	1		
A4Ⓧ	OUTPUT MODULE ASSEMBLY	497172	89536	497172	1		
	6070A	497172	89536	497172	1		
	6071A	546234	89536	546234	1		
A5/A6	REAR PANEL ASSEMBLY	497206	89536	497206	1		
A7	DELAY CABLE ASSEMBLY (A3)	527457	89536	527457	1		2
A8	MAINTENANCE EXTENDER CARD (6070A/6071A)	546390	89536	546390	1		
H1	SCREW, FHP, 6-32 X 1/4	320093	89536	320093	46		
H2	SCREW, SEMS, 6-32 X 1/2	177030	89536	177030	4		
H3	SCREW, PAN HEAD, 6-32	152165	89536	152165	6		
H5	SCREW, SHOULDER, #8	528653	89536	528653	2		
H6	SCREW, PHP, 8-32 X 1/4	320044	89536	320044	4		
H7	SCREW, FHP, 8-32 X 1	353052	89536	353052	8		
H8	WASHER, LOCK, #8	111070	89536	111070	12		
H9	HINGE	487868	89536	487868	2		
H10	SCREW, SHOULDER (A3)	528653	89536	528653	2		2
H11	WASHER, LOCK, #8 (A3)	111070	89536	111070	4		2
H12	WASHER, FLAT (A3)	111054	89536	111054	44		2
H13	SCREW, PHP, 4-40 X 5/16	268193	89536	268193	12		
MP1	ANCHOR, CABLE	571927	06915	UC-4	1		
MP2	BAIL, STAND	523571	89536	523571	2		
MP3	CLAMP, CABLE	479428	89536	479428	1		
MP4	COVER, BOTTOM UNIT	462382	89536	462382	1		
MP5	COVER, TOP UNIT	462374	89536	462374	1		
MP6	DECAL, HANDLE	394395	89536	394395	4		
MP7	TRIM, SIDE CHASSIS	489187	89536	489187	2		
MP8	DECAL, SIDE TRIM	604736	89536	604736	2		
MP9	FOOT, BAIL STAND	527473	89536	527473	4		
MP10	FUSE, COVER, 110V	546606	89536	546606	1		
MP11	FUSE, COVER, 220V	546614	89536	546614	1		
MP12	SERIAL PLATE	472795	89536	472795	1		
MP13	LINE CORD (NOT SHOWN)	284174	89536	284174	1		
MP14	PLUG, HOLE (AUX OUT)	101774	89536	101774	1		
MP15	CABLE ANCHOR (A3)	529974	06915	UC-2	2		2
MP16	COVER, BOTTOM (A3)	537332	89536	537332	1		2
MP17	COVER, TOP (A3)	537340	89536	537340	1		2
MP18	COVER, TOP (A3)	537381	89536	537381	1		2
MP19	HINGE, MODULE (A3)	487868	89536	487868	2		2
MP20	SIDE CHASSIS ASSEMBLY (A3)	516286	89536	516286	2		2
MP21	PLUG, HOLE, 1/2" DIA (A3)	101774	89536	101774	1		2
MP22	GUIDE, INSTRUCTION CARD	527770	89536	527770	2		

Table 6-1. 6070A/6071A Final Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
MP23	TRAY, INSTRUCTION	487483	89536	487483	1		
TM1	6070/6071A MANUAL SET	577577	89536	577577			
TM1A	MANUAL, CALIBRATION	577551	89536	577551			
TM1B	MANUAL, OPERATOR	577544	89536	577544			
TM1C	MANUAL, SERVICE	578054	89536	578054			
TM1D	MANUAL, SCHEMATIC DIAGRAM	578781	89536	578781			
TM1E	MANUAL, BINDERS/CARDS	578062	89536	578062			
TM2	INSTRUCTION CARD	524793	89536	524793	1		
W3	CABLE ASSEMBLY, MOD, I/F	521781	89536	521781	1		
W4	CABLE ASSEMBLY, IEEE, I/F	521799	89536	521799	1		
W12	CABLE ASSEMBLY, SEMI-RIGID (A3)	523522	89536	523522	1		
W13	CABLE ASSEMBLY, SEMI-RIGID (A3)	523456	89536	523456	1		
W14	CABLE, SR, 240-520	508499	89536	508499	1		
W15	CABLE, SR, VAR 10	508580	89536	508580	1		
W16	CABLE, SR, HET 10	508572	89536	508572	1		
W17	CABLE, RG 188	205823	89536	205823	1		
W20	CABLE, SR, REF IN	508531	89536	508531	1		
W21	CABLE, SR, REF OUT	508523	89536	508523	1		
W24	CABLE, BNC	576090	89536	576090	1		
W25	CABLE, RG 188	259754	89536	259754	1		
W53	CABLE, RG 188	546705	89536	546705	1		
W72	CABLE ASSEMBLY, P/S	527440	89536	527440	1		
KIT	RECOMMENDED SPARE PARTS KIT	641746	89536	641746			1

1 BEFORE ORDERING SPARE PARTS OR SPARE PCB ASSEMBLIES, PLEASE CONTACT YOUR NEAREST JOHN FLUKE SERVICE CENTER FOR INFORMATION

2 THESE ITEMS ARE USED ON THE A3 MODULE.

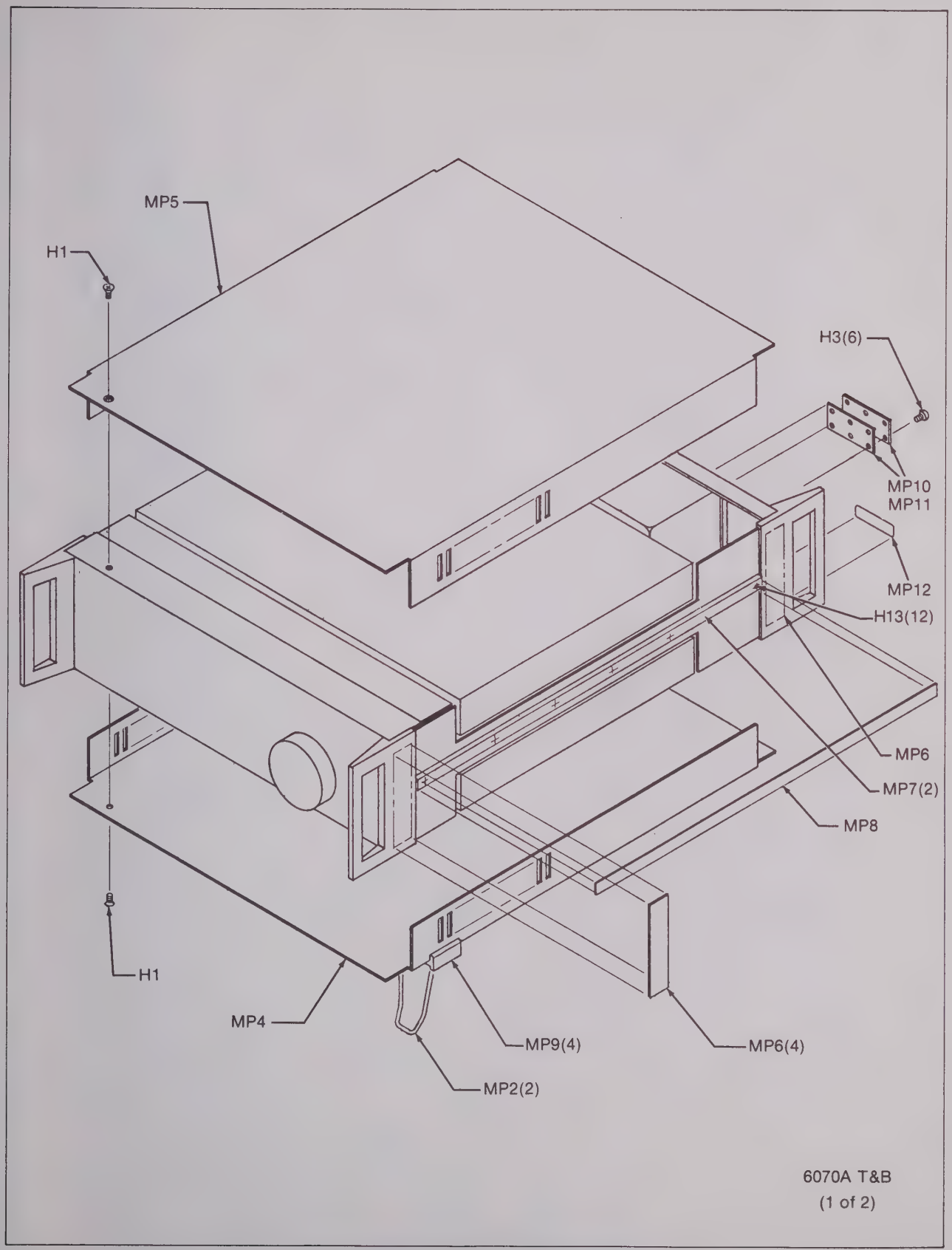
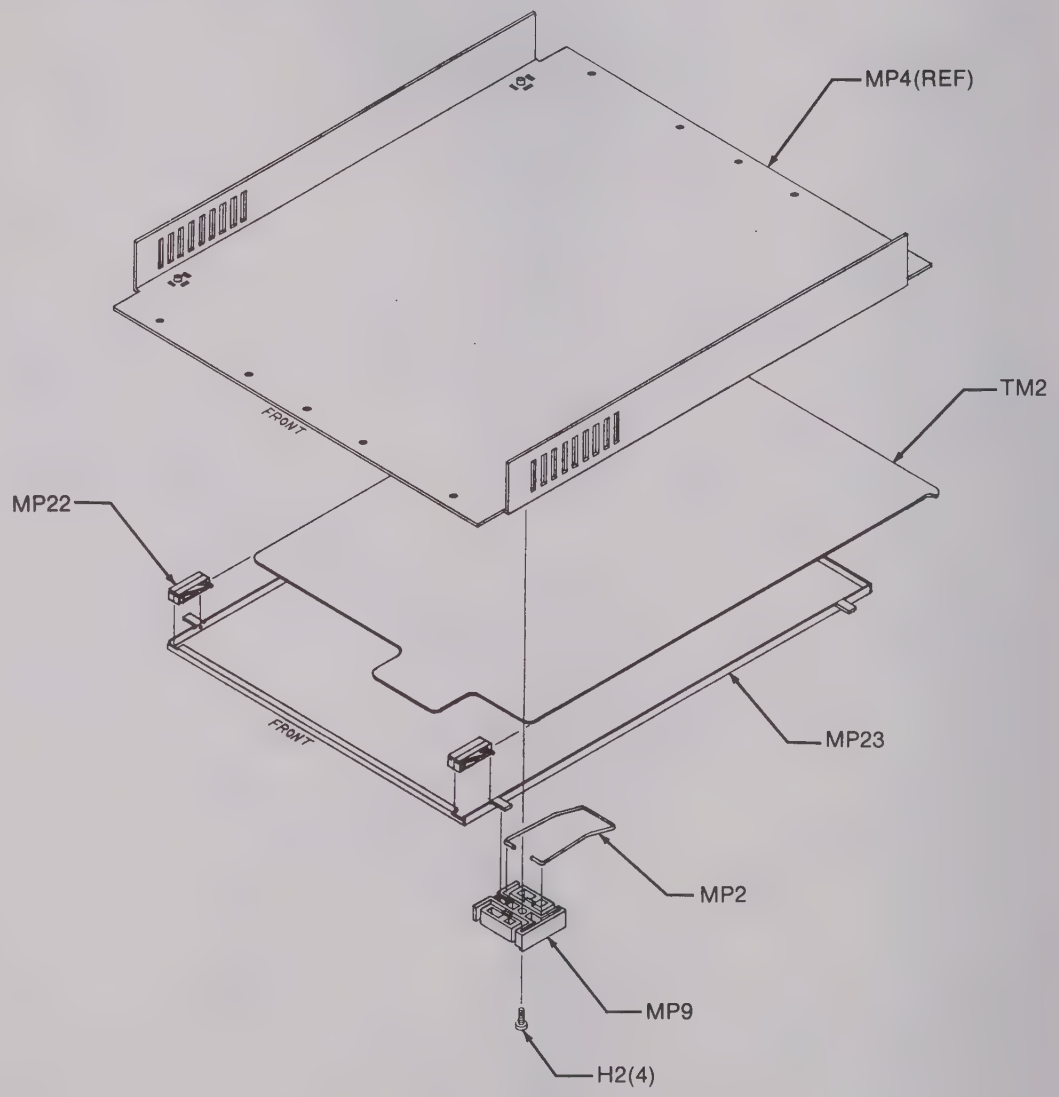


Figure 6-1. 6070A/6071A Final Assembly



6070A T&B
(2 of 2)

Figure 6-1. 6070A/6071A Final Assembly (cont)

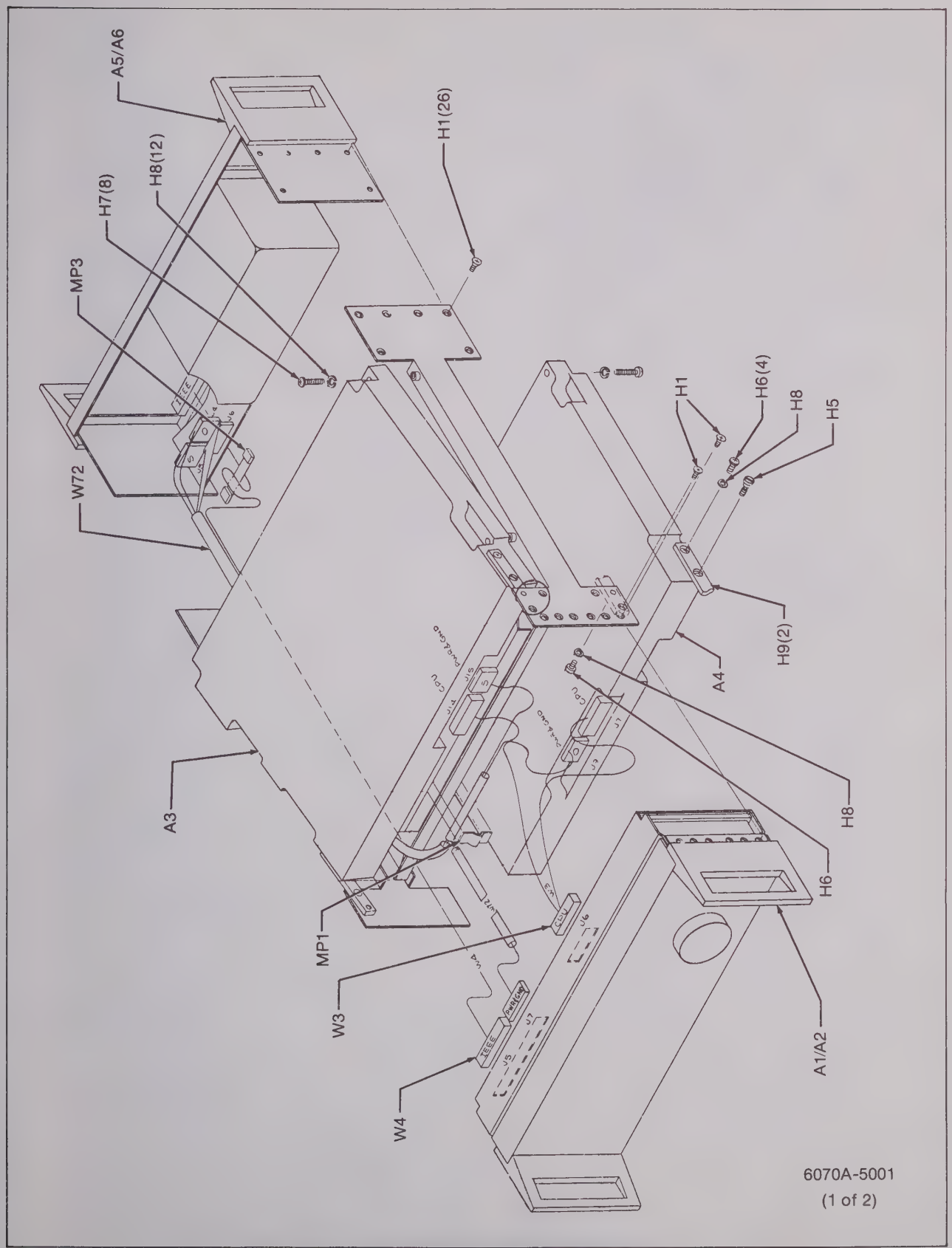


Figure 6-1. 6070A/6071A Final Assembly (cont)

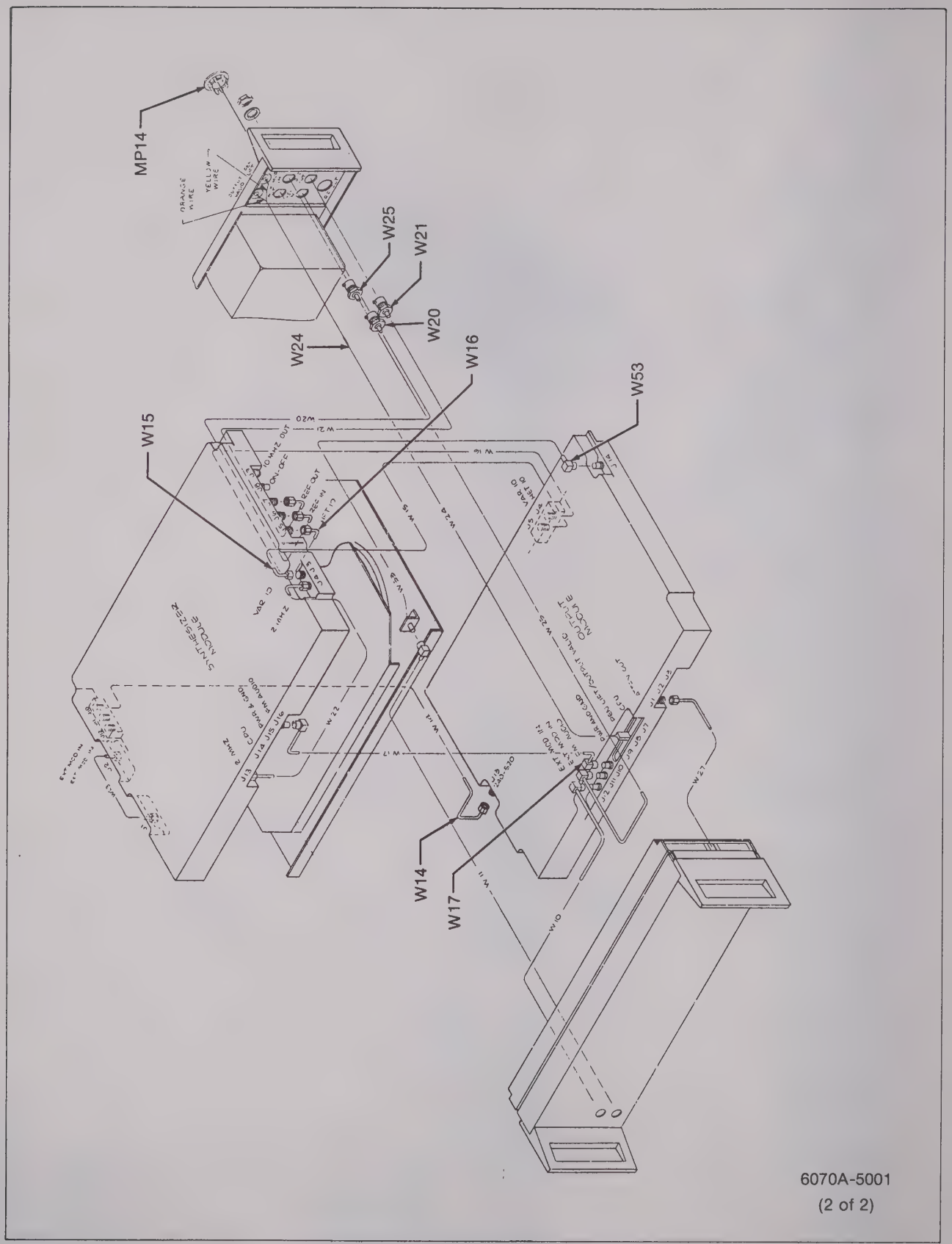


Figure 6-1. 6070A/6071A Final Assembly (cont)

Table 6-2. A1/A2 Front Panel and Controller Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
A1/A2	FRONT PANEL AND CONTROLLER ASSEMBLY FIGURE 6-2 (6070A/71A-4206T)	6070A	AND	6071A			
A1	FRONT PANEL ASSEMBLY				REF		
A2	CONTROLLER ASSEMBLY				REF		
H1	SCREW, FHP, 6-32 X 1/4	320093	89536	320093	8		
W1	CABLE ASSEMBLY	521773	89536	521773	1		
W71	CABLE ASSEMBLY	521765	89536	521765	1		

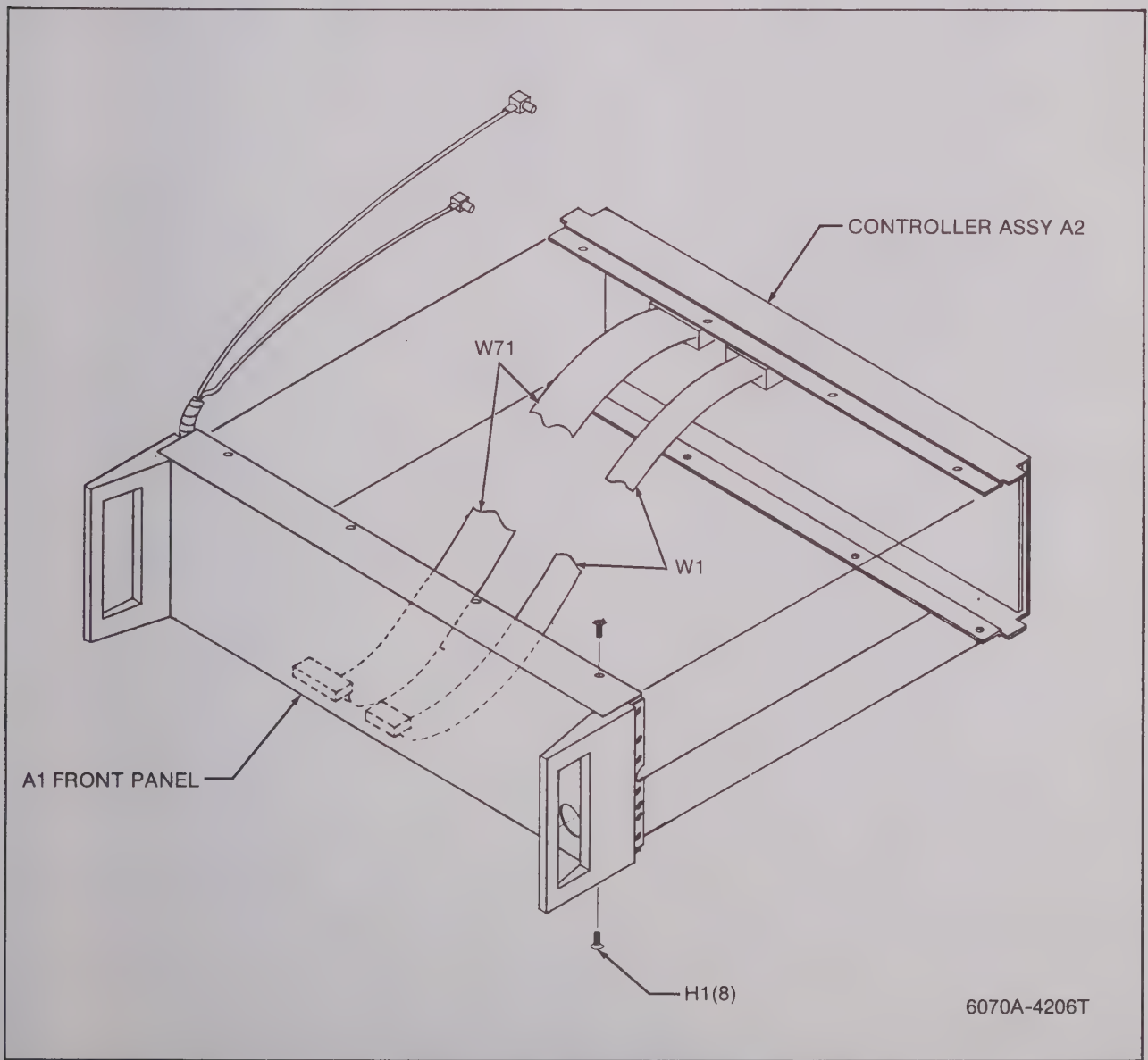


Figure 6-2. A1/A2 Front Panel and Controller Assembly

Table 6-2A. A1 Front Panel Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
A1	FRONT PANEL ASSEMBLY FIGURE 6-2A (6070A/71A-4206T)	6070A	AND	6071A	REF		1
A1A1Ⓟ	FRONT PANEL PCB ASSEMBLY	462390	89536	462390	1		
A1A2Ⓟ	ENCODER ASSEMBLY (NOT ILLUSTRATED)	497222	89536	497222	1		
H2	SCREW, FHP, 6-32 X 1/4	320093	89536	320093	7		
H4	SCREW, PHP, 6-32 X 1/2	320051	89536	320051	8		
H5	SCREW, CAP, BLACK 8-32 X 3/8	295105	89536	295105	4		
H6	SCREW, FHP, 8-32 X 3/8	114116	89536	114116	10		
H7	WASHER	544239	89536	544239	1		
H9	WASHER, SPRING STEEL	571968	89536	571968	8		
MP1	BUSHING, INSULATION	537803	89536	537803	1		
MP2	CORNER BRACKET ASSEMBLY	540708	89536	540708	2		
MP3	FRONT PANEL	462358	89536	462358	1		
MP4	HANDLE, BLACK	394312	89536	394312	2		
MP6	KNOB, ENCODER TUNING	514950	89536	514950	1		
MP7	SHIELD, PROTECTIVE	536623	89536	536623	1		
MP8	DECAL, FRONT PANEL						
	6070A	508325	89536	508325	1		
	6071A	535500	89536	535500	1		

1 PROCURABLE AT COMPONENT LEVEL ONLY.

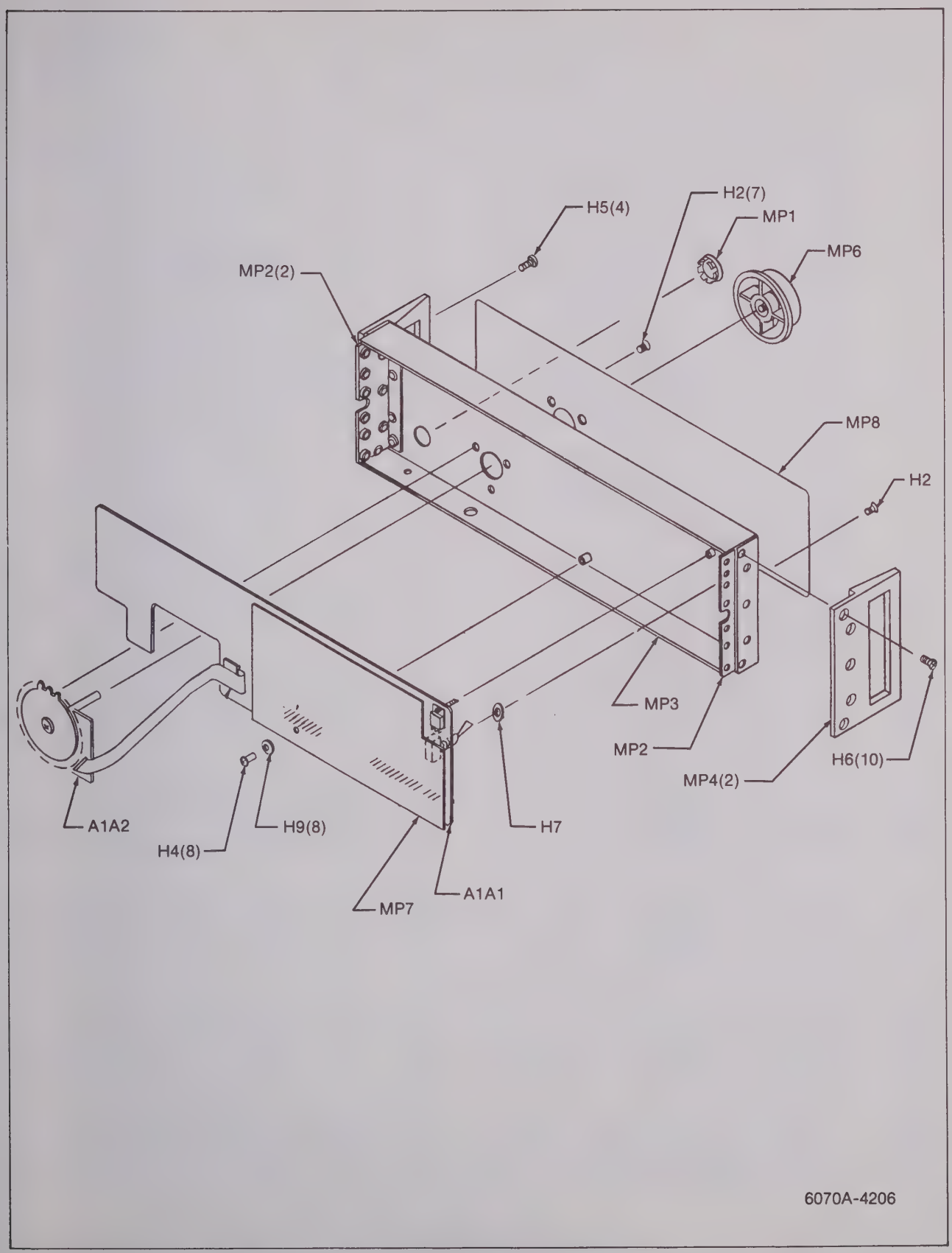


Figure 6-2A. A1 Front Panel Assembly

Table 6-3. A1A1 Front Panel PCB Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
A1A1Ⓧ	FRONT PANEL PCB ASSEMBLY FIGURE 6-3 (6070A-4001T)	462390	89536	462390	REF		
C1	CAP, CER, 330 UF +/-10%, 6V	193011	56289	150D330X9006S2	1		
C2	CAP, TA, 2.2 UF +/-2%, 15V	364216	56289	196D225X0015HA1	2		
C3	CAP, TA, 220 UF +/-20%, 6V	408682	56289	196D227X0006TE4	1		
C4	CAP, TA, 2.2 UF +/-2%, 15V	364216	56289	196D225X0015HA1	REF		
C5	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	2		
C6	CAP, TA, 1 UF +/-20%, 35V	161919	56289	196D010X0035G	1		
C7	CAP, CER, 100 PF +/-10%, 1000V	105593	71590	DD-101	1		
C8	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C9	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	11		
C10	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C11	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C12	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C13	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C14	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C15	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C16	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C17	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C18	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C19	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
DS1	LIGHT EMITTING DIODE	504761	14936	MV57124	17	4	
DS2	LED, LIGHT BAR MODULE	534834	28480	HLMP 2300	7	2	
DS3	LIGHT EMITTING DIODE	504761	14936	MV57124	REF		
DS4	LIGHT EMITTING DIODE	504761	14936	MV57124	REF		
DS5	LED, LIGHT BAR MODULE	534834	28480	HLMP 2300	REF		
DS6	LIGHT EMITTING DIODE	504761	14936	MV57124	REF		
DS7	LED, LIGHT BAR MODULE	534834	28480	HLMP 2300	REF		
DS8	LIGHT EMITTING DIODE	504761	14936	MV57124	REF		
DS9	LED, LIGHT BAR MODULE	534834	28480	HLMP 2300	REF		
DS10	LIGHT EMITTING DIODE	504761	14936	MV57124	REF		
DS11	LED, LIGHT BAR MODULE	534834	28480	HLMP 2300	REF		
DS12	LED, LIGHT BAR MODULE	534834	28480	HLMP 2300	REF		
DS13	LIGHT EMITTING DIODE	504761	14936	MV57124	REF		
DS14	LIGHT EMITTING DIODE	504761	14936	MV57124	REF		
DS15	LIGHT EMITTING DIODE	504761	14936	MV57124	REF		
DS24	LIGHT EMITTING DIODE	504761	14936	MV57124	REF		
DS25	LIGHT EMITTING DIODE	504761	14936	MV57124	REF		
DS26	LIGHT EMITTING DIODE	504761	14936	MV57124	REF		
DS27	LIGHT EMITTING DIODE	504761	14936	MV57124	REF		
DS28	LIGHT EMITTING DIODE	504761	14936	MV57124	REF		
DS29	LIGHT EMITTING DIODE	504761	14936	MV57124	REF		
DS30	LIGHT EMITTING DIODE	504761	14936	MV57124	REF		
DS31	LED, LIGHT BAR MODULE	534834	28480	HLMP 2300	REF		
DS32	LIGHT EMITTING DIODE	504761	14936	MV57124	REF		
DS40	DISPLAY, LED, COMMON ANODE	472951	28480	QDSP3011	2	1	
DS41	DISPLAY, LED, SEVEN SEGMENT	472944	28480	QDSP3016	16	4	
DS42	DISPLAY, LED, SEVEN SEGMENT	472944	28480	QDSP3016	REF		
DS43	DISPLAY, LED, SEVEN SEGMENT	472944	28480	QDSP3016	REF		

Table 6-3. A1A1 Front Panel PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
DS44	DISPLAY, LED, SEVEN SEGMENT	472944	28480	QDSP3016	REF		
DS45	DISPLAY, LED, SEVEN SEGMENT	472944	28480	QDSP3016	REF		
DS46	DISPLAY, LED, SEVEN SEGMENT	472944	28480	QDSP3016	REF		
DS47	DISPLAY, LED, SEVEN SEGMENT	472944	28480	QDSP3016	REF		
DS48	DISPLAY, LED, SEVEN SEGMENT	472944	28480	QDSP3016	REF		
DS49	DISPLAY, LED, SEVEN SEGMENT	472944	28480	QDSP3016	REF		
DS50	DISPLAY, LED, SEVEN SEGMENT	472944	28480	QDSP3016	REF		
DS51	DISPLAY, LED, SEVEN SEGMENT	472944	28480	QDSP3016	REF		
DS52	DISPLAY, LED, SEVEN SEGMENT	472944	28480	QDSP3016	REF		
DS53	DISPLAY, LED, COMMON ANODE	472951	28480	QDSP3011	REF		
DS54	DISPLAY, LED, SEVEN SEGMENT	472944	28480	QDSP3016	REF		
DS55	DISPLAY, LED, SEVEN SEGMENT	472944	28480	QDSP3016	REF		
DS56	DISPLAY, LED, SEVEN SEGMENT	472944	28480	QDSP3016	REF		
DS57	DISPLAY, LED, SEVEN SEGMENT	472944	28480	QDSP3016	REF		
H1	SCREW, NYLON, 6-32 X 1/2 (W/Q12)	115006	89536	115006	1		
J1	CONNECTOR, POST	267500	00779	86144-2	34		
J2	CONNECTOR, POST	267500	00779	86144-2	REF		
J3	CONNECTOR, POST	267500	00779	86144-2	REF		
J4	CONNECTOR, COAXIAL	479162	24931	28JR175	3		
J5	CONNECTOR, COAXIAL	479162	24931	28JR175	REF		
J6	CONNECTOR, COAXIAL	479162	24931	28JR175	REF		
L1	INDUCTOR, 50 MH	540823	89536	540823	1		
L2	INDUCTOR, 6-TURN	320911	89536	320911	2		
L3	INDUCTOR, 6-TURN	320911	89536	320911	REF		
L4	INDUCTOR, 1000 MH	256107	24759	MR-1000	1		
MP1	BUMPER, STICK-ON (W/R30)	543488	89536	543488	1		
MP2	COMPONENT TIE DOWN	422857	89536	422857	1		
MP3	PUSHBUTTON, BLACK	457390	89536	457390	1		
MP4	PUSHBUTTON, BLUE	406736	89536	406736	1		
MP6	PUSHBUTTON, LARGE, PUTTY GRAY	406819	89536	406819	2		
MP7	PUSHBUTTON, LIGHT PUTTY GRAY	401307	89536	401307	14		
MP8	PUSHBUTTON, LARGE, MEDIUM PUTTY GRAY	546382	89536	546382	2		
MP9	PUSHBUTTON, MEDIUM PUTTY GRAY	546358	89536	546358	4		
MP10	PUSHBUTTON, WHITE	406744	89536	406744	12		
MP11	PUSHBUTTON, YELLOW	419937	89536	419937	6		
Q1	TRANSISTOR, SI, PNP	352369	12040	2N4403	REF		
Q2	TRANSISTOR, SI, PNP	523647	04713	MPS6562S	REF		
Q3	TRANSISTOR, SI, PNP	523647	04713	MPS6562S	REF		
Q4	TRANSISTOR, SI, PNP	523647	04713	MPS6562S	REF		
Q5	TRANSISTOR, SI, PNP	523647	04713	MPS6562S	REF		
Q6	TRANSISTOR, SI, PNP	523647	04713	MPS6562S	REF		
Q7	TRANSISTOR, SI, PNP	523647	04713	MPS6562S	REF		
Q8	TRANSISTOR, SI, PNP	523647	04713	MPS6562S	REF		
Q9	TRANSISTOR, SI, PNP	523647	04713	MPS6562S	REF		
Q10	TRANSISTOR, SI, PNP	352369	12040	2N4403	REF		
Q11	TRANSISTOR, SI, NPN	218396	04713	2N3904	1	1	
Q12	TRANSISTOR, SI, PNP, POWER	369660	01295	TIP32	1	1	
R1	RES, DEP. CAR, 180 +/-5%, 1/4W	441436	80031	CR251-4-5P180E	2		
R2	RES, DEP. CAR, 47K +/-5%, 1/4W	348896	80031	CR251-4-5P47K	2		
R3	RES, DEP. CAR, 180 +/-5%, 1/4W	441436	80031	CR251-4-5P180E	REF		

Table 6-3. A1A1 Front Panel PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
R4	RES, DEP. CAR, 47K +/-5%, 1/4W	348896	80031	CR251-4-5P47K	REF		
R6	RES, DEP. CAR, 120 +/-5%, 1/4W	442293	80031	CR251-4-5P120E	4		
R7	RES, DEP. CAR, 62 +/-5%, 1/4W	441634	80031	CR251-4-5P62E	6		
R8	RES, DEP. CAR, 62 +/-5%, 1/4W	441634	80031	CR251-4-5P62E	REF		
R9	RES, DEP. CAR, 62 +/-5%, 1/4W	441634	80031	CR251-4-5P62E	REF		
R10	RES, DEP. CAR, 62 +/-5%, 1/4W	441634	80031	CR251-4-5P62E	REF		
R11	RES, DEP. CAR, 62 +/-5%, 1/4W	441634	80031	CR251-4-5P62E	REF		
R12	RES, DEP. CAR, 62 +/-5%, 1/4W	441634	80031	CR251-4-5P62E	REF		
R13	RES, COMP, 1.5K +/-5%, 1/2W	266353	01121	EB1525	1		
R14	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	3		
R15	RES, DEP. CAR, 5.1K +/-5%, 1/4W	368712	80031	CR251-4-5P5K1	1		
R16	RES, DEP. CAR, 130 +/-5%, 1/4W	442301	80031	CR251-4-5P130E	3		
R17	RES, DEP. CAR, 130 +/-5%, 1/4W	442301	80031	CR251-4-5P130E	REF		
R18	RES, DEP. CAR, 130 +/-5%, 1/4W	442301	80031	CR251-4-5P130E	REF		
R19	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R20	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R21	RES, DEP. CAR, 120 +/-5%, 1/4W	442293	80031	CR251-4-5P120E	REF		
R22	RES, DEP. CAR, 120 +/-5%, 1/4W	442293	80031	CR251-4-5P120E	REF		
R23	RES, DEP. CAR, 120 +/-5%, 1/4W	442293	80031	CR251-4-5P120E	REF		
R24	RES, DEP, CAR, 10 +/-5%, 1/4W	340075	80031	CR251-4-5P10E	4		
R25	RES, DEP, CAR, 10 +/-5%, 1/4W	340075	80031	CR251-4-5P10E	REF		
R26	RES, DEP. CAR, 2K +/-5%, 1/4W	441469	80031	CR251-4-5P2K	2		
R27	RES, DEP, CAR, 10 +/-5%, 1/4W	340075	80031	CR251-4-5P10E	REF		
R28	RES, DEP, CAR, 10 +/-5%, 1/4W	340075	80031	CR251-4-5P10E	REF		
R29	RES, DEP. CAR, 150 +/-5%, 1/4W	343442	80031	CR251-4-5P150E	1		
R30	RES, VAR, 1K +/-10%, 2W	614107	32997	3852C-166-102A	1		
R31	RES, MTL. FILM, 475 +/-1%, 1/8W	320010	91637	CMF554750F	1		
R32	RES, MTL. FILM, 5.62K +/-1%, 1/8W	235168	91637	CMF555621F	1		
R33	RES, MTL. FILM, 144.86K +/-0.1%, 1/8W	386391	89536	386391	1		
R34	RES, DEP. CAR, 0.5 +/-5%, 1/4W	381954	80031	CR251-4-5P0.5E	2		
R35	RES, DEP. CAR, 2K +/-5%, 1/4W	441469	80031	CR251-4-5P2K	REF		
R36	RES, DEP. CAR, 470 +/-5%, 1/4W	343434	80031	CR251-4-5P471E	3		
R37	RES, WW, 2 +/-1%, 2W	229542	89536	229542	1		
R38	RES, DEP. CAR, 0.5 +/-5%, 1/4W	381954	80031	CR251-4-5P0.5E	REF		
R39	RES, DEP. CAR, 470 +/-5%, 1/4W	343434	80031	CR251-4-5P471E	REF		
R40	RES, DEP. CAR, 470 +/-5%, 1/4W	343434	80031	CR251-4-5P471E	REF		
S00	SWITCH, LIGHT PUTTY GRAY (AM)	507335	89536	507335	8	2	
S1	SWITCH, SPDT, TOGGLE	519470	09353	U11-P4-D-C-Q-W/7807	1		
S01	SWITCH, LIGHTED, PUTTY GRAY (FM/OM)	507335	89536	507335	REF		
S02	SWITCH, LIGHTED, PUTTY GRAY (AM)	507335	89536	507335	REF		
S03	SWITCH, LIGHTED, PUTTY GRAY (FM/OM)	507335	89536	507335	REF		
S05	SWITCH, LIGHTED, PUTTY GRAY (DC COUPLED)	507335	89536	507335	REF		
S07	SWITCH, UNLIGHTED (LOCAL)	507319	89536	507319	42	9	
S10	SWITCH, UNLIGHTED (FREQUENCY)	507319	89536	507319	REF		
S11	SWITCH, UNLIGHTED (AMPL)	507319	89536	507319	REF		
S12	SWITCH, UNLIGHTED (MOD FREQ)	507319	89536	507319	REF		
S13	SWITCH, UNLIGHTED (AM)	507319	89536	507319	REF		
S14	SWITCH, UNLIGHTED (FM/OM)	507319	89536	507319	REF		
S15	SWITCH, LIGHTED, ORANGE (SHIFT)	524082	89536	524082	1	1	
S16	SWITCH, UNLIGHTED (INTEROGATE)	507319	89536	507319	REF		

Table 6-3. A1A1 Front Panel PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
S20	SWITCH, UNLIGHTED (STORE)	507319	89536	507319	REF		
S21	SWITCH, UNLIGHTED (TOP)	507319	89536	507319	REF		
S22	SWITCH, UNLIGHTED (RECALL)	507319	89536	507319	REF		
S25	SWITCH, UNLIGHTED (NEXT ¦)	507319	89536	507319	REF		
S26	SWITCH, UNLIGHTED (NEXT ¦)	507319	89536	507319	REF		
S27	SWITCH, UNLIGHTED (TOP)	507319	89536	507319	REF		
S30	SWITCH, UNLIGHTED (0)	507319	89536	507319	REF		
S31	SWITCH, UNLIGHTED (1)	507319	89536	507319	REF		
S32	SWITCH, UNLIGHTED (2)	507319	89536	507319	REF		
S33	SWITCH, UNLIGHTED (3)	507319	89536	507319	REF		
S34	SWITCH, UNLIGHTED (4)	507319	89536	507319	REF		
S35	SWITCH, UNLIGHTED (5)	507319	89536	507319	REF		
S36	SWITCH, UNLIGHTED (6)	507319	89536	507319	REF		
S37	SWITCH, UNLIGHTED (7)	507319	89536	507319	REF		
S40	SWITCH, UNLIGHTED (8)	507319	89536	507319	REF		
S41	SWITCH, UNLIGHTED (9)	507319	89536	507319	REF		
S42	SWITCH, UNLIGHTED (.)	507319	89536	507319	REF		
S43	SWITCH, UNLIGHTED (+/-)	507319	89536	507319	REF		
S44	SWITCH, UNLIGHTED (MHz/v)	507319	89536	507319	REF		
S45	SWITCH, UNLIGHTED (kHz/mV)	507319	89536	507319	REF		
S46	SWITCH, UNLIGHTED (Hz/uV)	507319	89536	507319	REF		
S47	SWITCH, UNLIGHTED (RAD/dB(m))	507319	89536	507319	REF		
S50	SWITCH, UNLIGHTED (%)	507319	89536	507319	REF		
S51	SWITCH, UNLIGHTED (CLEAR)	507319	89536	507319	REF		
S52	SWITCH, UNLIGHTED (¦)	507319	89536	507319	REF		
S53	SWITCH, UNLIGHTED (¦)	507319	89536	507319	REF		
S54	SWITCH, UNLIGHTED (AMPL)	507319	89536	507319	REF		
S55	SWITCH, UNLIGHTED (MOD)	507319	89536	507319	REF		
S56	SWITCH, UNLIGHTED (FREQ)	507319	89536	507319	REF		
S57	SWITCH, UNLIGHTED (OFF)	507319	89536	507319	REF		
S61	SWITCH, LIGHTED, PUTTY GRAY (MANUAL)	507335	89536	507335	REF		
S62	SWITCH, UNLIGHTED (SINGLE)	507319	89536	507319	REF		
S63	SWITCH, UNLIGHTED (AUTO)	507319	89536	507319	REF		
S64	SWITCH, LIGHTED, PUTTY GRAY (SLOW)	507335	89536	507335	REF		
S65	SWITCH, UNLIGHTED (OFF)	507319	89536	507319	REF		
S66	SWITCH, LIGHTED, BLACK (REL FREQ)	507327	89536	507327	2		1
S67	SWITCH, LIGHTED, BLACK (REL AMPL)	507327	89536	507327	REF		
S70	SWITCH, LIGHTED, PUTTY GRAY (ON)	507335	89536	507335	REF		
S71	SWITCH, UNLIGHTED (<---)	507319	89536	507319	REF		
S72	SWITCH, UNLIGHTED (--->)	507319	89536	507319	REF		
TP1	CONNECTOR, TEST POINT	512889	00779	62395-1	4		
TP2	CONNECTOR, TEST POINT	512889	00779	62395-1	REF		
TP3	CONNECTOR, TEST POINT	512889	00779	62395-1	REF		
TP4	CONNECTOR, TEST POINT	512889	00779	62395-1	REF		
U1	IC, LINEAR, OP-AMP	418566	12040	LM358N	2		1
U2	IC, 8-BIT ADDRESSABLE LATCH	419242	01295	SN74LS259N	8		2
U3	RESISTOR NETWORK	501502	89536	501502	2		
U4	IC, TRANSISTOR ARRAY, 7-DRIVERS	413237	56289	ULN2003A	6		2
U5	IC, TRANSISTOR ARRAY, 7-DRIVERS	413237	56289	ULN2003A	REF		
U6	RESISTOR NETWORK	448423	89536	448423	2		

Table 6-3. A1A1 Front Panel PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
U7	IC, TTL, HEX INVERTER, BUFFER/DRIVER	288605	01295	SN7416N	3	1	
U8	IC, 8-BIT ADDRESSABLE LATCH	419242	01295	SN74LS259N	REF		
U9	IC, TRANSISTOR ARRAY, 7-DRIVERS	413237	56289	ULN2003A	REF		
U10	IC, 8-BIT ADDRESSABLE LATCH	419242	01295	SN74LS259N	REF		
U11	RESISTOR NETWORK	446880	89536	446880	1		
U12	RESISTOR NETWORK	381616	89536	381616	1		
U13	IC, TRANSISTOR ARRAY, 7-DRIVERS	413237	56289	ULN2003A	REF		
U14	IC, TRANSISTOR ARRAY, 7-DRIVERS	413237	56289	ULN2003A	REF		
U15	IC, TTL, LO-PWR, 3-8 LINE DECODER	407585	01295	SN74LS138N	1	1	
U16	IC, 8-BIT ADDRESSABLE LATCH	419242	01295	SN74LS259N	REF		
U17	RESISTOR NETWORK	501502	89536	501502	REF		
U18	IC, TRANSISTOR ARRAY, 7-DRIVERS	413237	56289	ULN2003A	REF		
U19	IC, 8-BIT ADDRESSABLE LATCH	419242	01295	SN74LS259N	REF		
U20	IC, LO-PWR SCHOTTKY	404186	01295	SN74LS123N	1	1	
U21	IC, LO-PWR SCHOTTKY	393124	01295	SN74LS74N	1	1	
U22⊗	IC, C-MOS, QUAD, 2-INPUT NAND GATE	355198	04713	MC14011UBCP	2	1	
U23	IC, TTL, LO-PWR SCHOTTKY DATA SELECT	407577	01295	SN74LS251N	1	1	
U24⊗	IC, C-MOS, QUAD, 2-INPUT NAND GATE	355198	04713	MC14011UBCP	REF		
U25⊗	IC, C-MOS, QUAD, 2-INPUT NAND GATE	404632	02735	CD4093BE	1	1	
U26	RESISTOR NETWORK	414003	89536	414003	1		
U27	RESISTOR NETWORK	448423	89536	448423	REF		
U28	IC, TTL, HEX INVERTER, BUFFER/DRIVER	288605	01295	SN7416N	REF		
U29	IC, TTL, HEX INVERTER, BUFFER/DRIVER	288605	01295	SN7416N	REF		
U30	IC, 8-BIT ADDRESSABLE LATCH	419242	01295	SN74LS259N	REF		
U31	IC, 8-BIT ADDRESSABLE LATCH	419242	01295	SN74LS259N	REF		
U32	IC, 8-BIT ADDRESSABLE LATCH	419242	01295	SN74LS259N	REF		
U33	IC, LINEAR, OP-AMP	418566	12040	LM358N	REF		
U34	IC, MONOLITHIC, 10-BIT D/A CONVERTER	477760	24355	AD561J	1	1	
W10	CABLE ASSEMBLY	527580	89536	527580	1		
W11	CABLE ASSEMBLY	577916	89536	577916	1		
XDS2	SOCKET, 4-POS, SIP	461756	00779	583773-1	5		
XDS5	SOCKET, 4-POS, SIP	461756	00779	583773-1	REF		
XDS7	SOCKET, 4-POS, SIP	461756	00779	583773-1	REF		
XDS9	SOCKET, 4-POS, SIP	461756	00779	583773-1	REF		
XDS11	SOCKET, 8-POS, SIP	512293	00779	1-583773-5	1		
XDS12	SOCKET, 8-POS, SIP	512293	00779	1-583773-5	REF		
XDS31	SOCKET, 4-POS, SIP	461756	00779	583773-1	REF		
XDS40	SOCKET, IC, 14 PIN	453514	71785	133-59-90-0901/14E	26		
XDS41	SOCKET, IC, 14 PIN	453514	71785	133-59-90-0901/14E	REF		
XDS42	SOCKET, IC, 14 PIN	453514	71785	133-59-90-0901/14E	REF		
XDS43	SOCKET, IC, 14 PIN	453514	71785	133-59-90-0901/14E	REF		
XDS44	SOCKET, IC, 14 PIN	453514	71785	133-59-90-0901/14E	REF		
XDS45	SOCKET, IC, 14 PIN	453514	71785	133-59-90-0901/14E	REF		
XDS46	SOCKET, IC, 14 PIN	453514	71785	133-59-90-0901/14E	REF		
XDS47	SOCKET, IC, 14 PIN	453514	71785	133-59-90-0901/14E	REF		
XDS48	SOCKET, IC, 14 PIN	453514	71785	133-59-90-0901/14E	REF		
XDS49	SOCKET, IC, 14 PIN	453514	71785	133-59-90-0901/14E	REF		
XDS50	SOCKET, IC, 14 PIN	453514	71785	133-59-90-0901/14E	REF		
XDS51	SOCKET, IC, 14 PIN	453514	71785	133-59-90-0901/14E	REF		
XDS52	SOCKET, IC, 14 PIN	453514	71785	133-59-90-0901/14E	REF		

Table 6-3. A1A1 Front Panel PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
XDS53	SOCKET, IC, 14 PIN	453514	71785	133-59-90-0901/14E	REF		
XDS54	SOCKET, IC, 14 PIN	453514	71785	133-59-90-0901/14E	REF		
XDS55	SOCKET, IC, 14 PIN	453514	71785	133-59-90-0901/14E	REF		
XDS56	SOCKET, IC, 14 PIN	453514	71785	133-59-90-0901/14E	REF		
XDS57	SOCKET, IC, 14 PIN	453514	71785	133-59-90-0901/14E	REF		
XU1	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	2		
XU2	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	22		
XU3	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU4	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU5	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU6	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU7	SOCKET, IC, 14 PIN	453514	71785	133-59-90-0901/14E	REF		
XU8	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU9	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU10	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU12	SOCKET, IC, 14 PIN	453514	71785	133-59-90-0901/14E	REF		
XU13	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU14	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU15	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU16	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU17	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU18	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU19	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU20	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU21	SOCKET, IC, 14 PIN	453514	71785	133-59-90-0901/14E	REF		
XU22	SOCKET, IC, 14 PIN	453514	71785	133-59-90-0901/14E	REF		
XU23	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU24	SOCKET, IC, 14 PIN	453514	71785	133-59-90-0901/14E	REF		
XU25	SOCKET, IC, 14 PIN	453514	71785	133-59-90-0901/14E	REF		
XU27	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU28	SOCKET, IC, 14 PIN	453514	71785	133-59-90-0901/14E	REF		
XU29	SOCKET, IC, 14 PIN	453514	71785	133-59-90-0901/14E	REF		
XU30	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU31	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU32	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU33	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	REF		
XU34	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		

CAUTION
SUBJECT TO DAMAGE BY
STATIC ELECTRICITY

6070A-1601

Figure 6-3. A1A1 Front Panel PCB Assembly

Table 6-4. A2 Controller Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
A2	CONTROLLER ASSEMBLY FIGURE 6-4 (6070A/71A-4206T)	6070A	AND	6071A	REF		1
A2A1	CONTROLLER PCB ASSEMBLY	462424	89536	462424	1		
A2A4	CONTROLLER PCB ASSEMBLY	489674	89536	489674	1		
H1	SCREW, SELF LOCKING, 6-32 X 1/2	177030	89536	177030	1		
H2	SCREW, FHP, 6-32 X 1/4	320093	89536	320093	10		
H3	SCREW, SELF LOCKING, 6-32 X 1/4	178533	89536	178533	6		
H4	SCREW, PHP, 6-32 X 3/8	334458	89536	334458	7		
H7	WASHER, SPRING STEEL	571968	89536	571968	7		
MP1	NYLON SPACER	543223	89536	543223	1		
MP5	HOUSING, CONTROLLER	509109	89536	509109	1		
MP8	GASKET, RFI,	519231	89536	519231	A/R		
MP9	PLATE, CONTROLLER	488452	89536	488452	1		

1 PROCURABLE AT COMPONENT LEVEL ONLY.

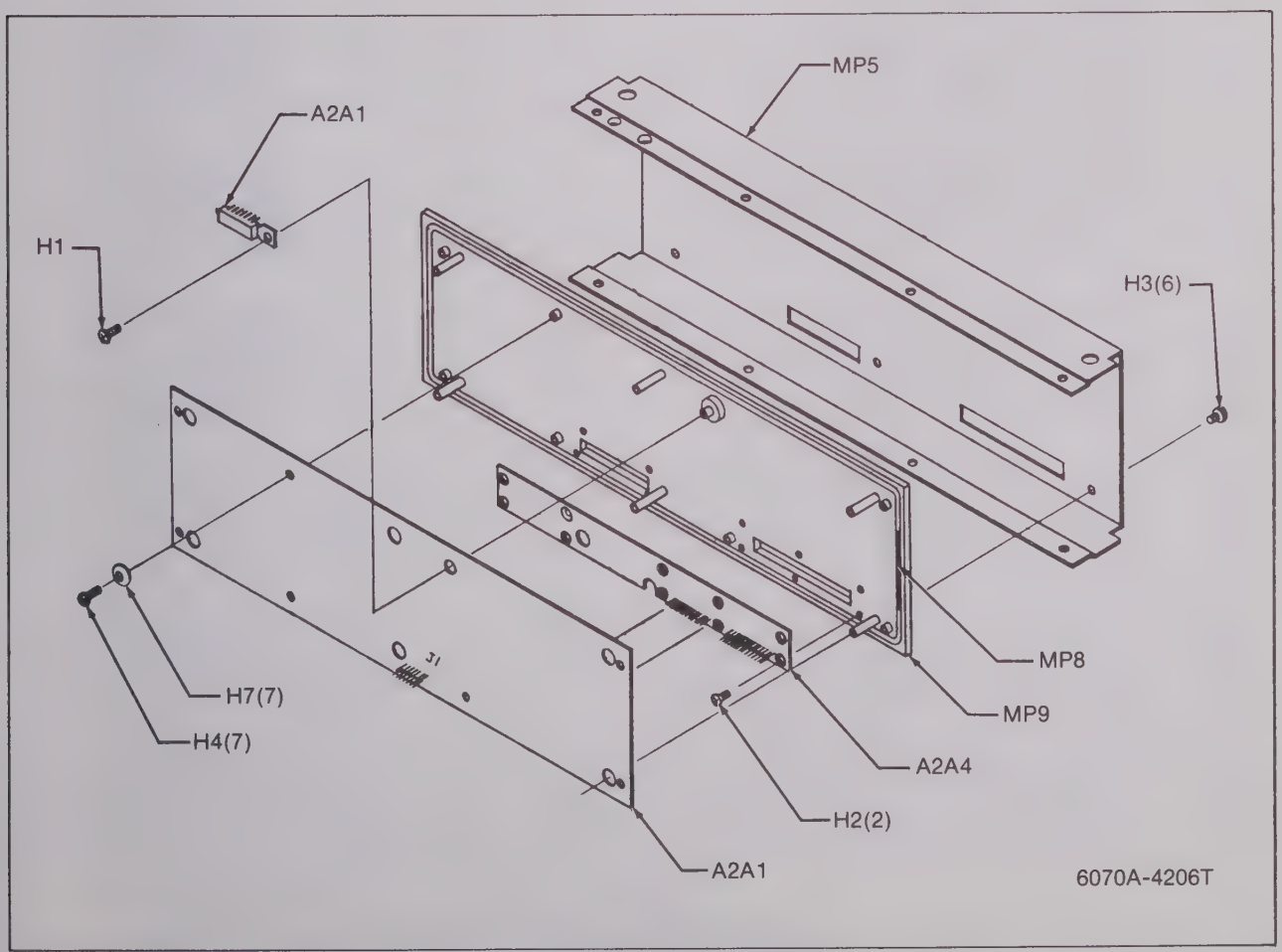


Figure 6-4. A2 Controller Assembly

Table 6-5. A2A1 Controller PCB Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
A2A1Ⓧ	CONTROLLER PCB ASSEMBLY FIGURE 6-5 (6070A-4004T-25/25T)	462424	89536	462424	REF		
C1	CAP, TA, 0.22 UF +/-20%, 35V	161331	56289	196D224X0035HA1	18		
C2	CAP, TA, 0.22 UF +/-20%, 35V	161331	56289	196D224X0035HA1	REF		
C3	CAP, TA, 0.22 UF +/-20%, 35V	161331	56289	196D224X0035HA1	REF		
C4	CAP, TA, 0.22 UF +/-20%, 35V	161331	56289	196D224X0035HA1	REF		
C5	CAP, TA, 0.22 UF +/-20%, 35V	161331	56289	196D224X0035HA1	REF		
C6	CAP, TA, 0.22 UF +/-20%, 35V	161331	56289	196D224X0035HA1	REF		
C7	CAP, TA, 0.22 UF +/-20%, 35V	161331	56289	196D224X0035HA1	REF		
C8	CAP, TA, 0.22 UF +/-20%, 35V	161331	56289	196D224X0035HA1	REF		
C9	CAP, TA, 22 UF +/-20%, 15V	423012	56289	196D226X0015KA1	7		
C10	CAP, TA, 22 UF +/-20%, 15V	423012	56289	196D226X0015KA1	REF		
C12	CAP, TA, 22 UF +/-20%, 15V	423012	56289	196D226X0015KA1	REF		
C13	CAP, TA, 22 UF +/-20%, 15V	423012	56289	196D226X0015KA1	REF		
C14	CAP, TA, 22 UF +/-20%, 15V	423012	56289	196D226X0015KA1	REF		
C15	CAP, TA, 22 UF +/-20%, 15V	423012	56289	196D226X0015KA1	REF		
C17	CAP, TA, 2.2 UF +/-20%, 20V	161927	56289	196D225X0020HA1	6		
C18	CAP, TA, 22 UF +/-20%, 15V	423012	56289	196D226X0015KA1	REF		
C19	CAP, CER, 0.1 UF +/-GMV, 50V	369199	71590	U1-50-103	1		
C20	CAP, CER, 15 PF +/-2%, 100V	369074	89536	369074	1		
C22	CAP, TA, 2.2 UF +/-20%, 20V	161927	56289	196D225X0020HA1	REF		
C23	CAP, TA, 0.22 UF +/-20%, 35V	161331	56289	196D224X0035HA1	REF		
C24	CAP, TA, 0.22 UF +/-20%, 35V	161331	56289	196D224X0035HA1	REF		
C26	CAP, TA, 0.22 UF +/-20%, 35V	161331	56289	196D224X0035HA1	REF		
C27	CAP, TA, 0.22 UF +/-20%, 35V	161331	56289	196D224X0035HA1	REF		
C28	CAP, TA, 0.22 UF +/-20%, 35V	161331	56289	196D224X0035HA1	REF		
C29	CAP, TA, 2.2 UF +/-20%, 20V	161927	56289	196D225X0020HA1	REF		
C30	CAP, TA, 0.22 UF +/-20%, 35V	161331	56289	196D224X0035HA1	REF		
C31	CAP, TA, 0.22 UF +/-20%, 35V	161331	56289	196D224X0035HA1	REF		
C32	CAP, TA, 0.22 UF +/-20%, 35V	161331	56289	196D224X0035HA1	REF		
C33	CAP, TA, 0.22 UF +/-20%, 35V	161331	56289	196D224X0035HA1	REF		
C34	CAP, TA, 2.2 UF +/-20%, 20V	161927	56289	196D225X0020HA1	REF		
C37	CAP, TA, 0.22 UF +/-20%, 35V	161331	56289	196D224X0035HA1	REF		
C38	CAP, TA, 2.2 UF +/-20%, 20V	161927	56289	196D225X0020HA1	REF		
C39	CAP, TA, 2.2 UF +/-20%, 20V	161927	56289	196D225X0020HA1	REF		
C40	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	1		
C41	CAP, ELECT, 1500 UF -10/+100%, 6.3V	166330	80031	ET152X6P3A01	2		
C42	CAP, ELECT, 1500 UF -10/+100%, 6.3V	166330	80031	ET152X6P3A01	REF		
C43	CAP, CER, 100 PF +/-2%, 100V	512848	89536	512848	1		
CR2	DIODE, HI-SPEED SWITCHING	203323	04713	1N4448	5	1	
CR4	DIODE, SI	343491	04713	1N4001	1	1	
CR5	DIODE, HI-SPEED SWITCHING	203323	04713	1N4448	REF		
CR6	DIODE, HI-SPEED SWITCHING	203323	04713	1N4448	REF		
CR7	DIODE, LIGHT EMITTING	369777	28480	5082-4480	1	1	
CR9	DIODE, HI-SPEED SWITCHING	203323	04713	1N4448	REF		
CR10	DIODE, HI-SPEED SWITCHING	203323	04713	1N4448	REF		
CR11	DIODE, ZENER	393579	04713	1N4567	1	1	
J1	CONNECTOR, POST	267500	00779	86144-2	65		
L1	INDUCTOR, 6 TURN	320911	89536	320911	4		

Table 6-5. A2A1 Controller PCB Assembly (cont)

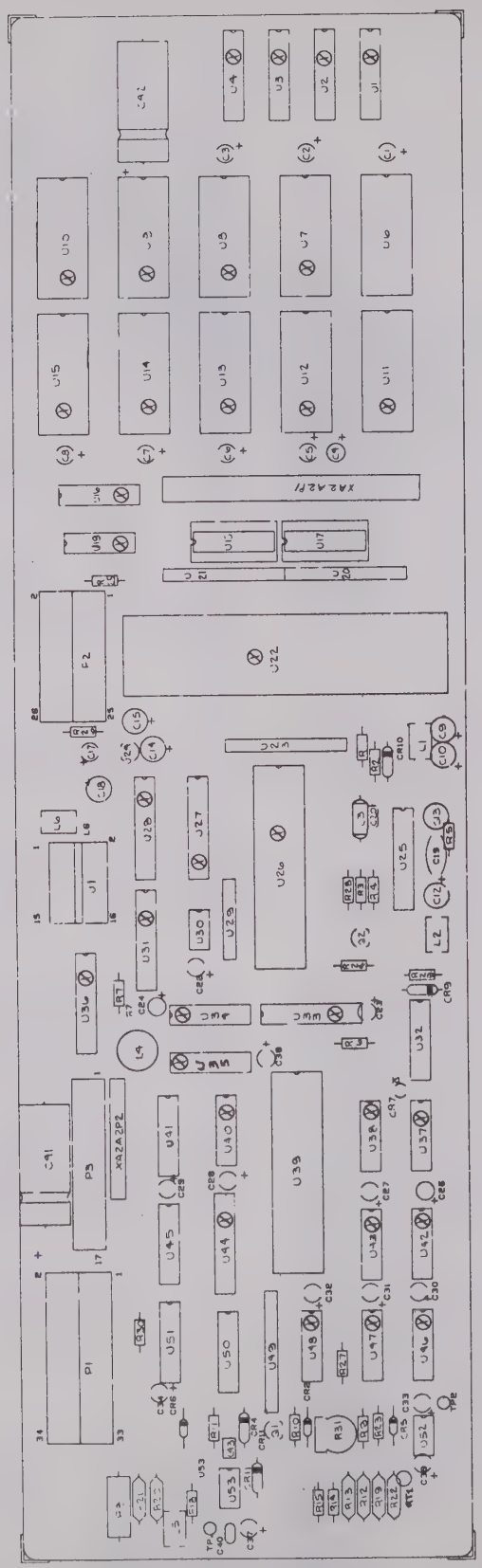
REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
L2	INDUCTOR, 6 TURN	320911	89536	320911	REF		
L3	INDUCTOR, 0.27 UH	313031	24759	MR0.27	1		
L4	INDUCTOR, +5V LINE	540823	89536	540823	1		
L5	INDUCTOR, 6 TURN	320911	89536	320911	REF		
L6	INDUCTOR, 6 TURN	320911	89536	320911	REF		
P1	CONNECTOR, 17 CIRCUIT	513408	27264	22-17-2172	3		
P2	CONNECTOR, 13 CIRCUIT	513390	27264	22-17-2132	2		
P3	CONNECTOR, 17 CIRCUIT	513408	27264	22-17-2172	REF		
Q1	TRANSISTOR, SI, PNP	195974	04713	2N3906	1	1	
Q2	TRANSISTOR, SI, NPN	218396	04713	2N3904	1	1	
R1	RES, DEP. CAR, 20 +/-5%, 1/4W	442202	80031	CR251-4-5P20E	4		
R2	RES, DEP. CAR, 20 +/-5%, 1/4W	442202	80031	CR251-4-5P20E	REF		
R3	RES, DEP. CAR, 20 +/-5%, 1/4W	442202	80031	CR251-4-5P20E	REF		
R4	RES, DEP. CAR, 20 +/-5%, 1/4W	442202	80031	CR251-4-5P20E	REF		
R5	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	4		
R6	RES, DEP. CAR, 330 +/-5%, 1/4W	368720	80031	CR251-4-5P330E	1		
R7	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	9		
R8	RES, COMP, 39 +/-10%, 1W	109645	01121	GB3901	1		
R9	RES, DEP. CAR, 82K +/-5%, 1/4W	348912	80031	CR251-4-5P82K	1		
R10	RES, DEP. CAR, 510 +/-5%, 1/4W	441600	80031	CR251-4-5P510E	1		
R11	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R12	RES, MTL. FILM, 3.32K +/-1%, 1/8W	312652	91637	CMF553321F	1		
R13	RES, MTL. FILM, 4.75K +/-1%, 1/8W	260679	91637	CMF554751F	1		
R14	RES, DEP. CAR, 1.8K +/-5%, 1/4W	441444	80031	CR251-4-5P1K8	1		
R15	RES, DEP. CAR, 1.3K +/-5%, 1/4W	441394	80031	CR251-4-5P1K3	1		
R18	RES, DEP. CAR, 6.8K +/-5%, 1/4W	368761	80031	CR251-4-5P6K8	1		
R19	RES, MTL. FILM, 20K +/-1%, 1/8W	291872	91637	CMF552002F	3		
R20	RES, MTL. FILM, 20K +/-1%, 1/8W	291872	91637	CMF552002F	REF		
R21	RES, MTL. FILM, 1.96K +/-1%, 1/8W	288423	91637	CMF551961F	1		
R22	RES, MTL. FILM, 20K +/-1%, 1/8W	291872	91637	CMF552002F	REF		
R23	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R24	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R25	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R26	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R27	RES, DEP. CAR, 680 +/-5%, 1/4W	368779	80031	CR251-4-5P680E	1		
R28	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R29	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R30	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R31	RES, VAR, 500 +/-10%, 1/2W	447730	89536	447730	1		
R35	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
RT1	RES, TEMP. SENS. NEG TC	501304	50157	1D101	1		
TP1	CONNECTOR, TEST POINT	512889	00779	62395-1	2		
TP2	CONNECTOR, TEST POINT	512889	00779	62395-1	REF		
U1Ø	IC, MOS, SI, N-CHANNEL, GATE	472902	34649	P2114L	4	1	
U2Ø	IC, MOS, SI, N-CHANNEL, GATE	472902	34649	P2114L	REF		
U3Ø	IC, MOS, SI, N-CHANNEL, GATE	472902	34649	P2114L	REF		
U4Ø	IC, MOS, SI, N-CHANNEL, GATE	472902	34649	P2114L	REF		
U7Ø	IC, PROGRAMMED E-PROM	633537	89536	633537	1	1	
U8Ø	IC, PROGRAMMED E-PROM	633545	89536	633545	1	1	
U9Ø	IC, PROGRAMMED E-PROM	633552	89536	633552	1	1	

Table 6-5. A2A1 Controller PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
U10Ø	IC, PROGRAMMED E-PROM	633560	89536	633560	1	1	
U11Ø	IC, PROGRAMMED E-PROM	633529	89536	633529	1	1	
U12Ø	IC, PROGRAMMED E-PROM	633578	89536	633578	1	1	
U13Ø	IC, PROGRAMMED E-PROM	633586	89536	633586	1	1	
U14Ø	IC, PROGRAMMED E-PROM	633594	89536	633594	1	1	
U15Ø	IC, PROGRAMMED E-PROM	633602	89536	633602	1	1	
U16Ø	IC, TTL, LO-PWR, 3-8 LINE DECODER	407585	01295	SN74LS138N	3	1	
U17	HEADER, PROGRAMMED	413039	89536	413039	2	1	
U18	HEADER, PROGRAMMED	413039	89536	413039	REF		
U19Ø	IC, TTL, POS/NAND, HEX INVERTER	394536	01295	SN74LS05	1	1	
U20	RESISTOR NETWORK	414003	89536	414003	3	1	
U21	RESISTOR NETWORK	414003	89536	414003	REF		
U22Ø	IC, MICRO PROCESSOR	473249	01295	TMS9900	1	1	
U23	RESISTOR NETWORK	484303	89536	484303	1	1	
U24	IC, LIN, 3-TERMINAL NEG FIXED VOLT REG	454793	04713	MC79L05ACP	1	1	
U25	IC, HEAT SINK ASSY.	527390	89536	527390	1	1	
U26Ø	IC, NMOS, PROGRAMMABLE SYSTEMS INTERFACE	454991	01295	TMS9901N	1	1	
U27Ø	IC, LO-PWR, SCHOTTKY TRI-ST OCTAL BFR.	429902	12040	DMB1LS95N	6	2	
U28Ø	IC, LO-PWR, SCHOTTKY TRI-ST OCTAL BFR.	429902	12040	DMB1LS95N	REF		
U29	RESISTOR NETWORK	500876	89536	500876	1	1	
U30	SWITCH ASSEMBLY, 4-SPST	408559	00779	435166-2	1	1	
U31Ø	IC, LO-PWR, SCHOTTKY TRI-ST OCTAL BFR.	429902	12040	DMB1LS95N	REF		
U32	IC, TTL, LO-PWR SCHOTTKY HEX/QUADRUPLE	393215	01295	SN74LS175N	1	1	
U33Ø	IC, LO-PWR, SCHOTTKY TRI-ST OCTAL BFR.	429902	12040	DMB1LS95N	REF		
U34Ø	IC, TTL, LO-PWR, 3-8 LINE DECODER	407585	01295	SN74LS138N	REF		
U35Ø	IC, TTL, LO-PWR, 3-8 LINE DECODER	407585	01295	SN74LS138N	REF		
U36Ø	IC, LO-PWR, SCHOTTKY TRI-ST OCTAL BFR.	429902	12040	DMB1LS95N	REF		
U37Ø	IC, TTL, QUAD, 2-INPUT, POS NAND GATE	393033	01295	SN74LS00N	2	1	
U38Ø	IC, TTL, HEX INVERTER	393058	01295	SN74LS04N	1	1	
U39Ø	IC, MOS, N-CHANNEL, SI	477794	04713	MC68488P	1	1	
U40Ø	IC, TTL, QUAD, 2-INPUT POS OR GATE	393108	01295	SN74LS32N	1	1	
U41	IC, QUAD, INTERFACE, BUS XCVR	428649	04713	MC3446P	4	1	
U42Ø	IC, TTL, QUAD, 2-INPUT, POS NAND GATE	393033	01295	SN74LS00N	REF		
U43Ø	IC, TTL, QUAD, 2-INPUT POS AND GATE	393066	01295	SN74LS08N	1	1	
U44Ø	IC, LO-PWR, SCHOTTKY TRI-ST OCTAL BFR.	429902	12040	DMB1LS95N	REF		
U45	IC, QUAD, INTERFACE, BUS XCVR	428649	04713	MC3446P	REF		
U46Ø	IC, LO-POWER SCHOTTKY	393124	01295	SN74LS74N	2	1	
U47Ø	IC, LO-POWER SCHOTTKY	393124	01295	SN74LS74N	REF		
U48Ø	IC, TTL, QUAD BUS BUFFERS	472746	01295	SN74LS125N	1	1	
U49	RESISTOR NETWORK	414003	89536	414003	REF		
U50	IC, QUAD, INTERFACE, BUS XCVR	428649	04713	MC3446P	REF		
U51	IC, QUAD, INTERFACE, BUS XCVR	428649	04713	MC3446P	REF		
U52	IC, LINEAR COMPARATOR	352195	01295	SN72311P	2	1	
U53	IC, LINEAR COMPARATOR	352195	01295	SN72311P	REF		
XA2A2P1	CONNECTOR, POST	267500	00779	86144-2	REF		
XA2A2P2	CONNECTOR, POST	513861	00779	1-87022-7	11		
XU1	SOCKET, IC, 18-PIN	413229	01295	C93102	4		
XU2	SOCKET, IC, 18-PIN	413229	01295	C93102	REF		
XU3	SOCKET, IC, 18-PIN	413229	01295	C93102	REF		
XU4	SOCKET, IC, 18-PIN	413229	01295	C93102	REF		

Table 6-5. A2A1 Controller PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
XU7	SOCKET, IC, 24-PIN	376236	91506	324-AG39D	9		
XU8	SOCKET, IC, 24-PIN	376236	91506	324-AG39D	REF		
XU9	SOCKET, IC, 24-PIN	376236	91506	324-AG39D	REF		
XU10	SOCKET, IC, 24-PIN	376236	91506	324-AG39D	REF		
XU11	SOCKET, IC, 24-PIN	376236	91506	324-AG39D	REF		
XU12	SOCKET, IC, 24-PIN	376236	91506	324-AG39D	REF		
XU13	SOCKET, IC, 24-PIN	376236	91506	324-AG39D	REF		
XU14	SOCKET, IC, 24-PIN	376236	91506	324-AG39D	REF		
XU15	SOCKET, IC, 24-PIN	376236	91506	324-AG39D	REF		
XU16	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	10		
XU17	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU18	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU19	SOCKET, IC, 14-PIN	370304	12040	MM74C906M	9		
XU22	SOCKET, IC, 64-PIN	483842	06776	ICN-649-S5-T/G	1		
XU25	SOCKET, IC, 20-PIN	454421	01295	C932002	7		
XU26	SOCKET, IC, 40-PIN	429282	09922	DILB40P-108	2		
XU27	SOCKET, IC, 20-PIN	454421	01295	C932002	REF		
XU28	SOCKET, IC, 20-PIN	454421	01295	C932002	REF		
XU31	SOCKET, IC, 20-PIN	454421	01295	C932002	REF		
XU32	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU33	SOCKET, IC, 20-PIN	454421	01295	C932002	REF		
XU34	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU35	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU36	SOCKET, IC, 20-PIN	454421	01295	C932002	REF		
XU37	SOCKET, IC, 14-PIN	370304	12040	MM74C906M	REF		
XU38	SOCKET, IC, 14-PIN	370304	12040	MM74C906M	REF		
XU39	SOCKET, IC, 40-PIN	429282	09922	DILB40P-108	REF		
XU40	SOCKET, IC, 14-PIN	370304	12040	MM74C906M	REF		
XU41	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU42	SOCKET, IC, 14-PIN	370304	12040	MM74C906M	REF		
XU43	SOCKET, IC, 14-PIN	370304	12040	MM74C906M	REF		
XU44	SOCKET, IC, 20-PIN	454421	01295	C932002	REF		
XU45	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU46	SOCKET, IC, 14-PIN	370304	12040	MM74C906M	REF		
XU47	SOCKET, IC, 14-PIN	370304	12040	MM74C906M	REF		
XU48	SOCKET, IC, 14-PIN	370304	12040	MM74C906M	REF		
XU50	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU51	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU52	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	2		
XU53	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	REF		



CAUTION
SUBJECT TO DAMAGE BY
STATIC ELECTRICITY

6070A-1604-25

Figure 6-5. A2A1 Controller PCB Assembly

Table 6-6. A2A4 Controller Mother Board

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
A2A4	CONTROLLER MOTHER BOARD FIGURE 6-6 (6070A-4033)	489674	89536	489674	REF		
XA2A1P1	CONNECTOR, POST	513861	00779	1-87022-7	58		
XA2A1P2	CONNECTOR, POST	513861	00779	1-87022-7	REF		
XA2A1P3	CONNECTOR, POST	543538	00779	543538	14		

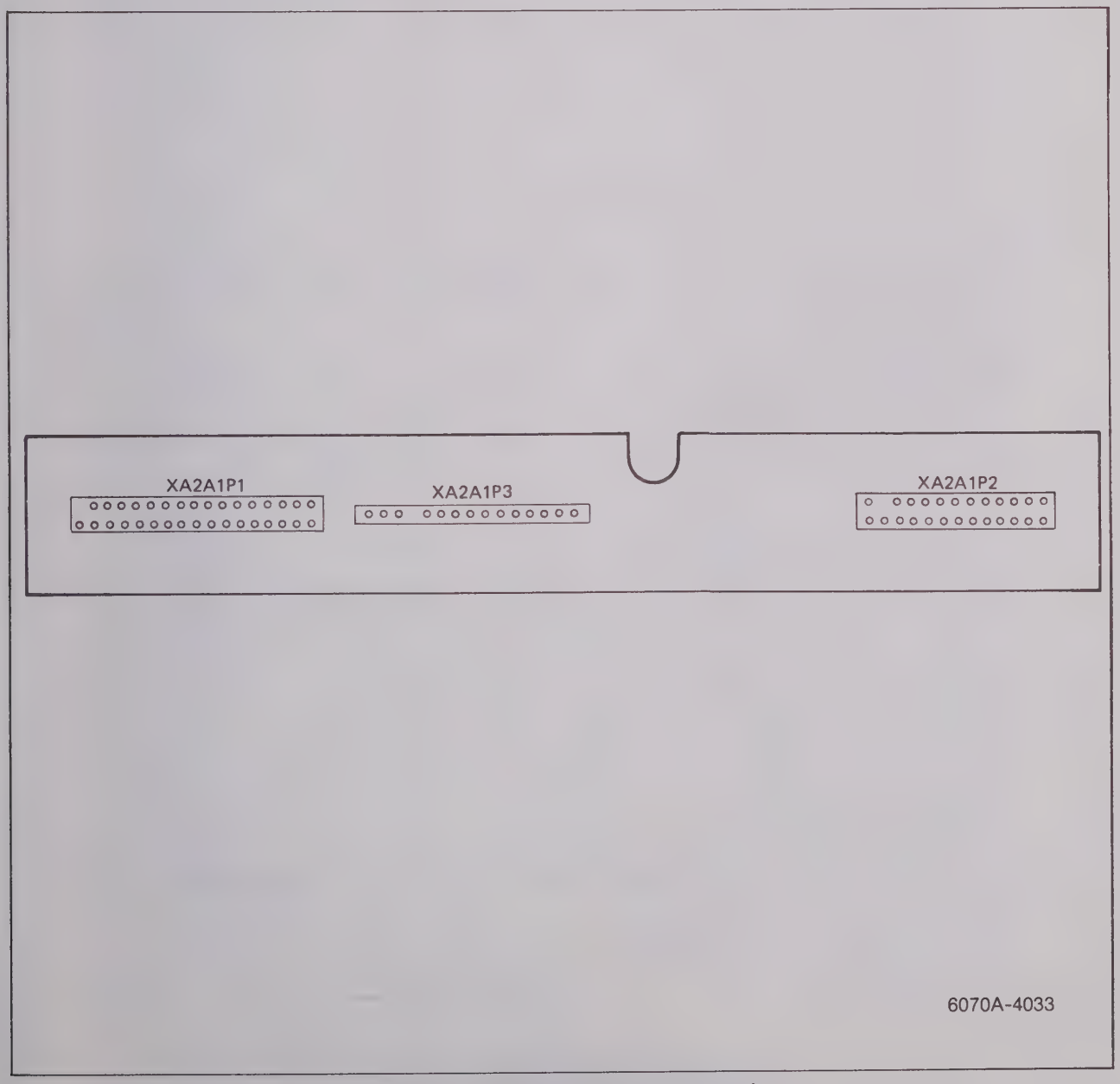


Figure 6-6. A2A4 Controller Mother Board

Table 6-7. A3 Synthesizer Module Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
A3Ⓧ	SYNTHESIZER MODULE ASSEMBLY FIGURE 6-7 (6070A-4202)	497198	89536	497198	REF		1
A3A1	PHASE DETECTOR PCB ASSEMBLY	463521	89536	463521	1		
A3A2Ⓧ	10 MHZ REFERENCE PCB ASSEMBLY	463646	89536	463646	1		
A3A3Ⓧ	DELAY DISCRIMINATOR PCB ASSEMBLY	463653	89536	463653	1		
A3A4	N/1 DIVIDER PCB ASSEMBLY	463547	89536	463547	1		
A3A5	VCO RESONATOR PCB ASSEMBLY (MATCHED TO A3A10)	463364	89536	463364	1		
A3A6	SINGLE SIDEBAND MIXER PCB ASSEMBLY	463513	89536	463513	1		
A3A7Ⓧ	SUB SYNTHESIZER PCB ASSEMBLY	463554	89536	463554	1		
A3A8Ⓧ	SYNTHESIZER CONTROL BUFFER PCB ASSEMBLY	463638	89536	463638	1		
A3A9Ⓧ	SYNTHESIZER DISTRIBUTION PCB ASSEMBLY	463687	89536	463687	1		
A6A3A10	VCO RESONATOR PCB ASSEMBLY (MATCHED TO A3A5)	463364	89536	463364	1		
H1	SCREW, FHP, 6-32 X 1/4	320093	89536	320093	8		
H2	SCREW, PHP, 6-32 X 9/32	544122	89536	544122	95		
H3	SCREW, FHP, 6-32 X 5/8	335158	89536	335158	2		
H4	SCREW, PHP, 6-32 X 5/8	412841	89536	412841	4		
H5	SCREW, PHP, 8-32 X 1/4	320044	89536	320044	4		
H6	WASHER, LOCK, #6	110692	89536	110692	2		
H7	WASHER, SPRING	571968	89536	571968	50		
J1-J10	CONNECTOR, FEED THRU (NOT LISTED) (PART OF MODULE FRAME WORK)						
MP1	PCB PULL AIDE	541730	89536	541730	30		
MP2	BRACKET, HEAT SINK	514992	89536	514992	2		
MP3	CAN, SUB SYNTH	534669	89536	534669	1		
MP4	CAN, VCO	524280	89536	524280	2		
MP5	COVER, SSB MIXER	580761	89536	580761	1		
MP6	FOOT, RUBBER	543488	52152	SJ-5008	1		
MP7	SPACER, MALE/FEMALE	585372	89536	585372	1		
U6	SEE A3A3 PCB ASSEMBLY, U6						
U23	SEE A3A3 PCB ASSEMBLY, U23						
W22	CABLE ASSEMBLY, SEMI-RIGID	508515	89536	508515	1		
W23	CABLE ASSEMBLY, RF	205773	89536	205773	1		
W31	CABLE ASSEMBLY, SEMI RIGID (SEE A3A3)						
W32	CABLE ASSEMBLY, SEMI RIGID (SEE A3A3)						
W33	CABLE ASSEMBLY, DD TO VCO (SEE A3A3)						
W34	CABLE ASSEMBLY	537761	89536	537761	2		
W35	CABLE ASSEMBLY	537761	89536	537761	REF		
W36	CABLE ASSEMBLY, RF	537787	89536	537787	1		

Table 6-7. A3 Synthesizer Module Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
W37	CABLE ASSEMBLY, RF (SEE A3A2)						
W38	CABLE ASSEMBLY, RF	205757	89536	205757	1		
W39	CABLE ASSEMBLY, SSB/VCO (SEE A3A6)						
W40	CABLE ASSEMBLY, RF (SEE A3A2)						
W41	CABLE ASSEMBLY (SEE A3A5)						
W42	CABLE ASSEMBLY (SEE A3A10)						
	1 THE A3 HARDWARE, COVERS, ETC., CAN BE FOUND ON THE MAIN FINAL ASSEMBLY AS MARKED BY A3, TABLE 6-1.						

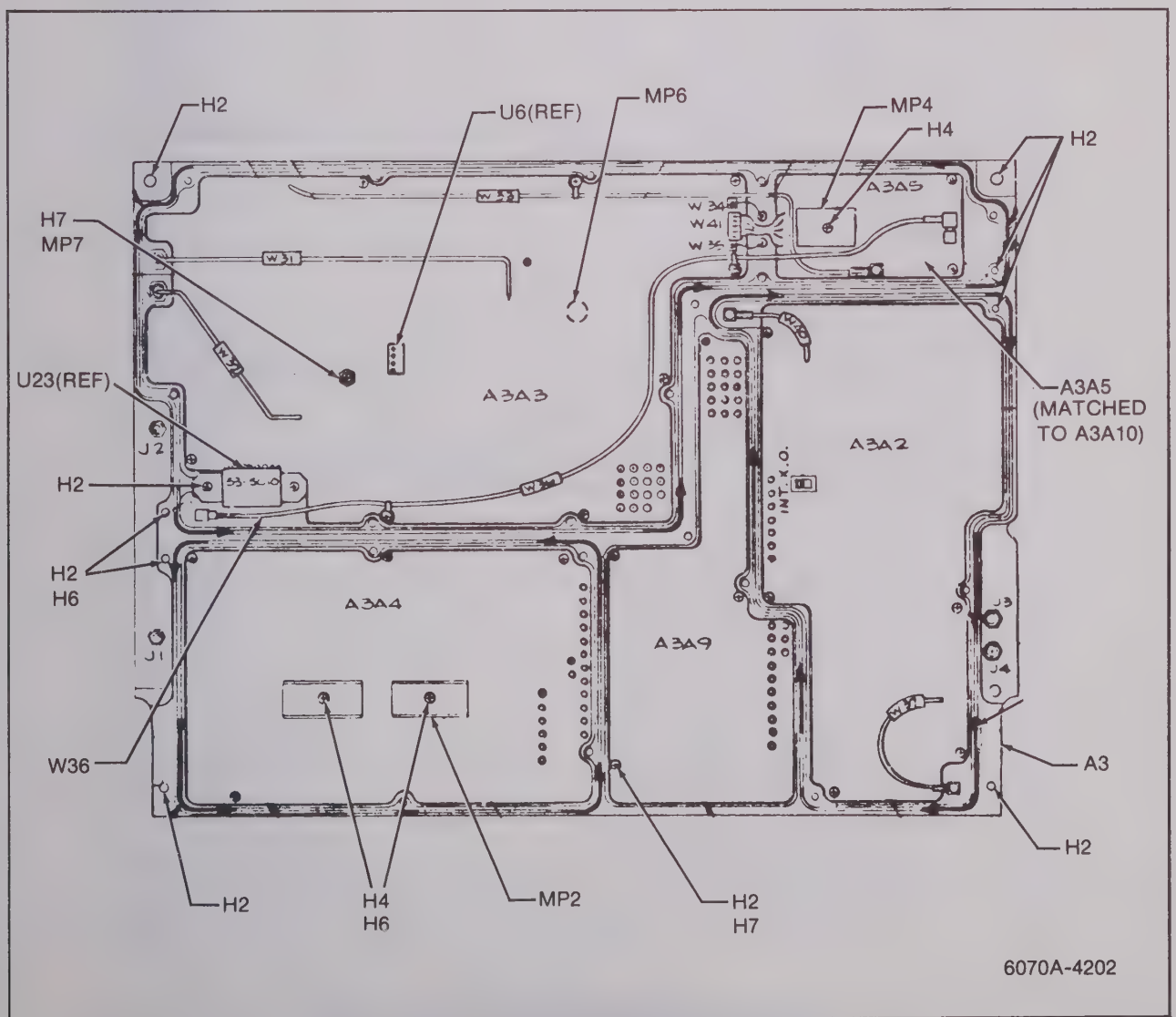


Figure 6-7. A3 Synthesizer Module Assembly

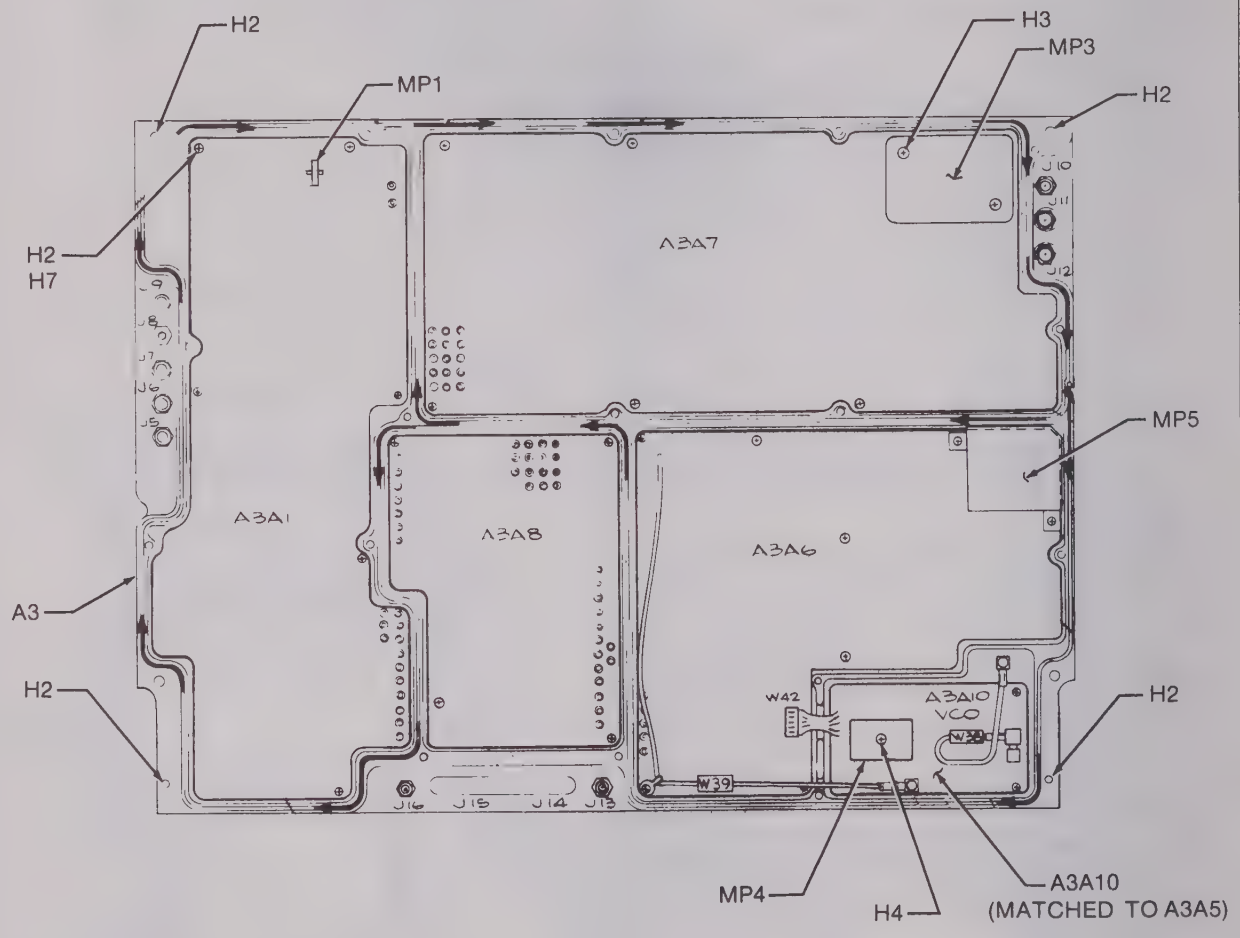


Figure 6-7. A3 Synthesizer Module Assembly (cont)

Table 6-8. A3A1 Phase Detector PCB Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
A3A1	PHASE DETECTOR PCB ASSEMBLY FIGURE 6-8 (6070A-4008T)	463521	89536	463521	REF		
C1	CAP, PLASTIC, 0.027 UF +/-10%, 250V	267120	73445	C280AE/A27K	1		
C2	CAP, CER, 150 PF +/-5%, 100V	512988	89536	512988	2		
C3	CAP, MYLAR, 0.01 UF +/-10%, 250V	325548	73445	C280MAE/A10K	1		
C4	CAP, CER, 750 PF +/-5%, 50V	528521	89536	528521	1		
C5	CAP, CER, 0.22 UF +/-20%, 50V	309849	72982	8131-050-651-022	10		
C6	CAP, CER, 0.22 UF +/-20%, 50V	309849	72982	8131-050-651-022	REF		
C7	CAP, CER, 150 PF +/-5%, 100V	512988	89536	512988	REF		
C8	CAP, POLY, 0.00715 UF +/-1%	422980	89536	422980	1		
C9	CAP, CER, 0.22 UF +/-20%, 50V	309849	72982	8131-050-651-022	REF		
C10	CAP, CER, 0.22 UF +/-20%, 50V	309849	72982	8131-050-651-022	REF		
C11	CAP, CER, 47 PF +/-2%, 100V	512368	89536	512368	1		
C12	CAP, TA, 22 UF +/-20%, 15V	423012	56289	196D226X0015KA1	3		
C13	CAP, TA, 22 UF +/-20%, 15V	423012	56289	196D226X0015KA1	REF		
C14	CAP, MYLAR, 0.0033 UF +/-10%, 50V	402867	80031	75F1R5A332	1		
C15	CAP, POLY, 0.0786 UF +/-1%, 50V	422998	89536	422998	1		
C16	CAP, CER, 0.22 UF +/-20%, 50V	309849	72982	8131-050-651-022	REF		
C17	CAP, CER, 0.22 UF +/-20%, 50V	309849	72982	8131-050-651-022	REF		
C20	CAP, CER, 0.22 UF +/-20%, 50V	309849	72982	8131-050-651-022	REF		
C21	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	5		
C22	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C23	CAR, CER, 0.005 UF +/-20%, 50V	255471	51642	200-050-601-502M	2		
C24	CAP. POLY, 620 PF +/-1%, 63V	513150	12954	B31063-620-1-63	1		
C25	CAP, POLY, 120 PF +/-1%, 63V	513168	12954	B31063-120-1-63	1		
C26	CAP, MYLAR, 0.82 UF +/-10%, 50V	530477	89536	530477	1		
C27	CAP, CER, 0.22 UF +/-20%, 50V	309849	72982	8131-050-651-022	REF		
C28	CAP, POLY, 5600 PF +/-5%, 63V	513135	12954	B31310/5600/5/63	1		
C29	CAP, POLY, 1800 PF +/-5%, 63V	513143	12954	B31063-1800-5-63	1		
C30	CAR, CER, 0.005 UF +/-20%, 50V	255471	51642	200-050-601-502M	REF		
C31	CAP, CER, 0.22 UF +/-20%, 50V	309849	72982	8131-050-651-022	REF		
C32	CAP, CER 22 PF +/-2%, 100V	512871	89536	512871	1		
C33	CAP, POLY, 1300 PF +/-5%, 63V	513127	12954	B31063-1300-6-63	1		
C34	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C35	CAP, CER, 0.22 UF +/-20%, 50V	309849	72982	8131-050-651-022	REF		
C36	CAP, CER, 100 PF +/-2%, 100V	512848	89536	512848	1		
C37	CAP, TA, 22 UF +/-20%, 15V	423012	56289	196D226X0015KA1	REF		
C38	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C39	CAP, TA, 2.2 UF +/-20%, 15V	364216	56289	196D225X0015HA1	1		
C40	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
CR1	DIODE, 2 PELLET	375477	09214	MPD200	4	1	
CR2	DIODE, 2 PELLET	375477	09214	MPD200	REF		
CR3	DIODE, 2 PELLET	375477	09214	MPD200	REF		
CR4	DIODE, 2 PELLET	375477	09214	MPD200	REF		
CR5	DIODE, SI, SWITCHING	313247	28480	HP5082-6264	4	1	
CR6	DIODE, SI, SWITCHING	313247	28480	HP5082-6264	REF		
CR7	DIODE, SI, SWITCHING	313247	28480	HP5082-6264	REF		
CR8	DIODE, SI, SWITCHING	313247	28480	HP5082-6264	REF		
CR9	DIODE, SI, HI-SPEED SWITCHING	203323	07910	1N4448	4	1	

Table 6-8. A3A1 Phase Detector PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
CR10	DIODE, SI, HI-SPEED SWITCHING	203323	07910	1N4448	REF		
CR11	DIODE, SI, HI-SPEED SWITCHING	203323	07910	1N4448	REF		
CR12	DIODE, SI, HI-SPEED SWITCHING	203323	07910	1N4448	REF		
CR13	DIODE, ZENER, 20.0 +/-5%	180463	04713	1N968B	1	1	
J1	CONNECTOR, RF, SMB	512095	16733	702033	1		
J3	CONNECTOR, RF, SMA	512087	16733	705147-001	2		
J4	CONNECTOR, RF, SMA	512087	16733	705147-001	REF		
K1	RELAY, 10W, 200V, 0.5A	461434	89536	461434	1		
L2	CHOKE, 6-TURN	320911	89536	320911	3		
L3	CHOKE, 6-TURN	320911	89536	320911	REF		
L4	INDUCTOR, 4.09 UH	510289	89536	510289	1		
L5	INDUCTOR, 5.11 UH	611913	89536	611913	1		
L6	CHOKE, 6-TURN	320911	89536	320911	REF		
P1	COMPONENT LEAD, SPRING TYPE	544056	00779	50871-1	15		
P2	COMPONENT LEAD, SPRING TYPE	544056	00779	50871-1	REF		
Q1	TRANSISTOR, PNP, HI-SPEED SWITCHING	369629	07263	543576	2	1	
Q2	TRANSISTOR, PNP, HI-SPEED SWITCHING	369629	07263	543576	REF		
Q3	TRANSISTOR	248351	04713	MPS918	2	1	
Q4	TRANSISTOR	248351	04713	MPS918	REF		
Q5	TRANSISTOR, SI, PNP	225599	89536	2N4250	2	1	
Q6	TRANSISTOR, SI, PNP	225599	89536	2N4250	REF		
Q7	TRANSISTOR, FIELD EFFECT	477729	89536	477729	2	1	
Q8	TRANSISTOR, FIELD EFFECT	477729	89536	477727	REF		
Q9	TRANSISTOR, NPN	218396	89536	218396	1	1	
R1	RES, DEP. CAR, 56K +/-5%, 1/4W	441626	80031	CR251-4-5P56K	1		
R2	RES, VAR, 10K +/-10%, 1/2W	309674	75378	360T-103A	1		
R3	RES, MTL. FILM, 887 +/-1%, 1/8W	320382	91637	CMF558870F	1		
R4	RES, VAR, 1K, +/-10%, 1/2W	393728	32997	3299W-CR2-102	1		
R5	RES, VAR, 200 +/-10%, 1/2W	275743	89536	275743	2		
R6	RES, MTL. FILM, 2.15K +/-1%, 1/8W	293712	91637	CMF552151F	1		
R7	RES, MTL. FILM, 200K +/-1%, 1/8W	235226	91637	CMF552003F	1		
R8	RES, MTL. FILM, 100 +/-0.1%, 1/8W	474437	89536	474437	1		
R9	RES, MTL. FILM, 2.05K +/-1%, 1/8W	293704	91637	CMF552051F	1		
R10	RES, VAR, 200 +/-10%, 1/2W	275743	89536	275743	REF		
R11	RES, DEP. CAR, 200K +/-5%, 1/4W	441485	80031	CR251-4-5P200K	1		
R12	RES, VAR, 2K	309666	89536	309666	1		
R13	RES, MTL. FILM, 1.54K +/-1%, 1/8W	289066	91637	CMF551541F	1		
R14	RES, MTL. FILM, 15.4K +/-1%, 1/8W	261651	91637	CMF551542F	1		
R15	RES, COMP, 510 +/-5%, 1/4W	441600	01121	CB5115	1		
R16	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	3		
R17	RES, DEP. CAR, 2.4K +/-5%, 1/4W	441493	80031	CR251-4-5P2K4	1		
R18	RES, COMP, 4.7K +/-5%, 1/4W	348821	01121	CB4725	1		
R19	RES, DEP. CAR, 130 +/-5%, 1/4W	442301	80031	CR251-4-5P130E	1		
R20	RES, DEP. CAR, 220 +/-5%, 1/4W	342626	80031	CR251-4-5P220E	2		
R21	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	2		
R22	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R23	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R24	RES, DEP. CAR, 36 +/-36%, 1/4W	442236	80031	CR251-4-5P36E	2		
R25	RES, VAR, 1K +/-10%, 1/2W	275750	11236	360T102A	2		
R26	RES, MTL. FILM, 1.13K +/-1%, 1/8W	347179	91637	CMF551131F	1		

Table 6-8. A3A1 Phase Detector PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
R27	RES, DEP. CAR, 200 +/-5%, 1/4W	441451	80031	CR251-4-5P200E	4		
R28	RES, MTL. FILM, 1.00K +/-1%, 1/8W	168229	91637	CMF551001F	2		
R29	RES, DEP. CAR, 200 +/-5%, 1/4W	441451	80031	CR251-4-5P200E	REF		
R30	RES, DEP. CAR, 390K +/-5%, 1/4W	442475	80031	CR251-4-5P390K	1		
R31	RES, MTL. FILM, 1.00K +/-1%, 1/8W	168229	91637	CMF551001F	REF		
R32	RES, COMP, 470 +/-5%, 1/2W	108787	01121	EB4715	2		
R33	RES, DEP. CAR, 36 +/-36%, 1/4W	442236	80031	CR251-4-5P36E	REF		
R34	RES, COMP, 470 +/-5%, 1/2W	108787	01121	EB4715	REF		
R35	RES, VAR, 25K +/-10%, 1/2W	494591	11236	360T-253A	1		
R36	RES, DEP. CAR, 6.2K +/-5%, 1/4W	442368	80031	CR251-4-5P6K2	1		
R37	RES, VAR, 1K +/-10%, 1/2W	275750	11236	360T102A	REF		
R38	RES, DEP. CAR, 2.7K +/-5%, 1/4W	386490	80031	CR251-4-5P2K7	2		
R39	RES, DEP. CAR, 200 +/-5%, 1/4W	441451	80031	CR251-4-5P200E	REF		
R40	RES, DEP. CAR, 200 +/-5%, 1/4W	441451	80031	CR251-4-5P200E	REF		
R41	RES, DEP. CAR, 220 +/-5%, 1/4W	342626	80031	CR251-4-5P220E	REF		
R42	RES, MTL. FILM, 499 +/-1%, 1/8W	168211	91637	CMF554990F	3		
R43	RES, MTL. FILM, 499 +/-1%, 1/8W	168211	91637	CMF554990F	REF		
R44	RES, MTL. FILM, 499 +/-1%, 1/8W	168211	91637	CMF554990F	REF		
R45	RES, MTL. FILM, 2.00K +/-1%, 1/8W	235226	91637	CMF552001F	2		
R46	RES, MTL. FILM, 2.00K +/-1%, 1/8W	235226	91637	CMF552001F	REF		
R47	RES, MTL. FILM, 5.49K +/-1%, 1/8W	334565	91637	CMF555491F	1		
R48	RES, DEP. CAR, 2K +/-5%, 1/4W	441469	80031	CR251-4-5P2K	1		
R49	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R50	RES, DEP. CAR, 100 +/-5%, 1/4W	348771	80031	CR251-4-5P100E	1		
R51	RES, DEP. CAR, 1.5K +/-5%, 1/4W	343418	80031	CR251-4-5P1K5	1		
R52	RES, DEP. CAR, 3.3K +/-5%, 1/4W	348813	80031	CR251-4-5P3K3	1		
R53	RES, DEP. CAR, 82 +/-5%, 1/4W	442277	80031	CR251-4-5P82E	1		
R54	RES, DEP. CAR, 2.7K +/-5%, 1/4W	386490	80031	CR251-4-5P2K7	REF		
S1	SWITCH, SLIDE, DPDT	393629	10389	23-021-114	1	1	
TP1-TP16	TEST POINTS	512889	02660	62395-1834	16		
U1	IC, TTL, SCHOTTKY QUAD 2-IN, POS NOR GAT	403626	01295	SN74S02N	1	1	
U2	IC, TTL, PRESET DECADE OR BINARY CNTR	473835	01295	SN74S196N	1	1	
U3	IC, DUAL, "D" TYPE, EDGE TRIGGERED, F/F	418269	01295	SN74S74N	1	1	
U4	IC, TTL, QUAD 2-IN, NAND GATE	363580	01295	SN74S00N	1	1	
U5	IC, OP-AMP, LO-NOISE	477745	18324	NE5534AN	1	1	
U6	IC, LINEAR, QUAD COMPARATOR	387233	12040	LM339N	3	1	
U7	IC, LINEAR, QUAD COMPARATOR	387233	12040	LM339N	REF		
U8	IC, LINEAR, QUAD COMPARATOR	387233	12040	LM339N	REF		
U9	IC, TTL, LO-PWR, 3-8 LINE DECODER	407585	01295	SN74LS138N	1	1	
U10	RESISTOR NETWORK, 10K, 10-PIN SIP	414003	89536	414003	1	1	
U11	IC, TTL, DUAL ONE-SHOT	404186	01295	SN74LS123N	1	1	
U12	IC, LINEAR ARRAY, 2-PNP, 16-PIN DIP	418954	02735	CA3096E	1	1	
U13	IC, LINEAR, OP-AMP	472779	12040	LF386N	1	1	
U14	IC, LINEAR, D-MOS FET QUAD ANALOG	507228	18324	SD5002N	3	1	
U15	IC, LINEAR, D-MOS FET QUAD ANALOG	507228	18324	SD5002N	REF		
U16	IC, HYBRID ASSEMBLY	492702	89536	492702	1	1	
U17	RESISTOR NETWORK, 10K, 16-PIN DIP	501841	89536	501841	1	1	
U18	IC, LINEAR, OP-AMP, J-FET INPUT	483438	89536	483438	1	1	
U19	IC, LINEAR, D-MOS FET QUAD ANALOG	507228	18324	SD5002N	REF		
U20	IC, LINEAR, OP-AMP	495051	18324	NE5534N	1	1	

Table 6-8. A3A1 Phase Detector PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
XU1	SOCKET, IC, 16-PIN DIP	370304	12040	MM74C906N	8		
XU2	SOCKET, IC, 16-PIN DIP	370304	12040	MM74C906N	REF		
XU3	SOCKET, IC, 16-PIN DIP	370304	12040	MM74C906N	REF		
XU4	SOCKET, IC, 16-PIN DIP	370304	12040	MM74C906N	REF		
XU5	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	3		
XU6	SOCKET, IC, 16-PIN DIP	370304	12040	MM74C906N	REF		
XU7	SOCKET, IC, 16-PIN DIP	370304	12040	MM74C906N	REF		
XU8	SOCKET, IC, 16-PIN DIP	370304	12040	MM74C906N	REF		
XU9	SOCKET, IC, 16-PIN DIP	370312	91506	316-AG39D	7		
XU11	SOCKET, IC, 16-PIN DIP	370312	91506	316-AG39D	REF		
XU12	SOCKET, IC, 16-PIN DIP	370312	91506	316-AG39D	REF		
XU13	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	REF		
XU14	SOCKET, IC, 16-PIN DIP	370312	91506	316-AG39D	REF		
XU15	SOCKET, IC, 16-PIN DIP	370312	91506	316-AG39D	REF		
XU17	SOCKET, IC, 16-PIN DIP	370312	91506	316-AG39D	REF		
XU18	SOCKET, IC, 16-PIN DIP	370304	12040	MM74C906N	REF		
XU19	SOCKET, IC, 16-PIN DIP	370312	91506	316-AG39D	REF		
XU20	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	REF		

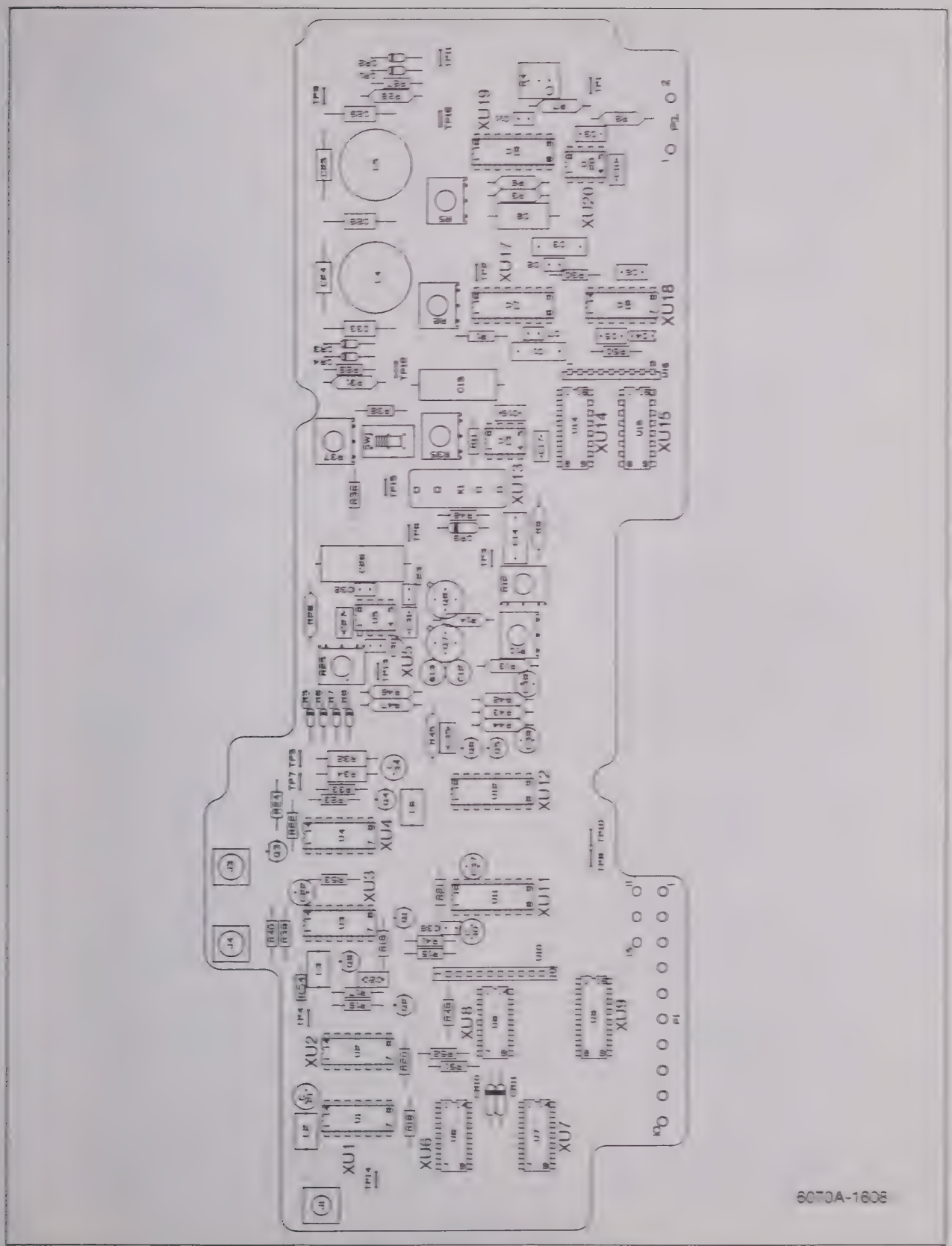


Figure 6-8. A3A1 Phase Detector PCB Assembly

Table 6-9. A3A2 10 MHz Reference PCB Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
A3A2Ø	10 MHZ REFERENCE PCB ASSEMBLY FIGURE 6-9 (6070A-4021T)	463646	89536	463646	REF		
C1	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	14		
C2	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C3	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C4	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C5	CAP, CER, 0.005 UF +/-20%, 50V	255471	51642	200-050-601-502M	3		
C6	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C7	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C8	CAP, CER, 0.005 UF +/-20%, 50V	255471	51642	200-050-601-502M	REF		
C9	CAP, VAR. 22 PF 100V	369207	80031	C010KA/20E	1		
C10	CAP, CER, 22 PF +/-2%, 100V	512871	89536	512871	1		
C11	CAP, CER, 33 PF +/-2%, 100V	513226	89536	513226	1		
C12	CAP, CER, 15 PF +/-2%, 100V	369074	89536	369074	1		
C13	CAP, CER, 39 PF +/-2%, 100V	512962	89536	512962	1		
C14	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C15	CAP, POLY, 0.022 UF +/-10%, 250V	234484	73445	C280AE/A22K	1		
C16	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C17	CAP, CER, 4700 PF	362871	72982	8121-A100-W5R-472M	1		
C18	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C19	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C20	CAP, CER, 0.22 UF +/-20%, 50V	309849	72982	8131-050-651-022	2		
C21	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C22	CAP, CER, 0.01 UF +/-20%, 100V	407361	72982	8121-A100-W5R-103M	2		
C23	CAP, CER, 0.047 UF +/-20%, 50V	460733	71590	CW20C473M	2		
C24	CAP, CER, 0.047 UF +/-20%, 50V	460733	71590	CW20C473M	REF		
C25	CAP, CER, 500 PF +/-10%, 1 KV	105692	71590	2DDH60N501K	1		
C26	CAP, CER, 0.22 UF +/-20%, 50V	309849	72982	8131-050-651-022	REF		
C27	CAP, CER, 0.005 UF +/-20%, 50V	255471	51642	200-050-601-502M	REF		
C28	CAP, TA, 22 UF +/-20%, 15V	423012	56289	196D226X0015KA1	1		
C29	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C30	CAP, CER, 56 PF +/-2%, 100V	512970	89536	512970	1		
C31	CAP, CER, 150 PF +/-5%, 100V	512988	89536	512988	1		
C32	CAP, CER, 0.01 UF +/-20%, 100V	407361	72982	8121-A100-W5R-103M	REF		
C33	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C34	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
CR1	DIODE, TUNING, 200MA	363812	04713	MV109	1		
CR3	DIODE, SI, HI-SPEED SWITCHING	203323	07910	1N4448	2		
CR4	DIODE, SI, HI-SPEED SWITCHING	203323	07910	1N4448	REF		
J5	CONNECTOR, RF, SMA	512087	16733	705147-001	4		
J6	CONNECTOR, RF, SMA	512087	16733	705147-001	REF		
J7	CONNECTOR, RF, SMA	512087	16733	705147-001	REF		
J8	CONNECTOR, RF, SMB	512095	16733	702033	1		
J9	CONNECTOR, RF, SMA	512087	16733	705147-001	REF		
L1	INDUCTOR, 6 TURN	320911	89635	320911	9		
L2	INDUCTOR, 6 TURN	320911	89635	320911	REF		
L3	INDUCTOR, 6 TURN	320911	89635	320911	REF		
L4	INDUCTOR, 6 TURN	320911	89635	320911	REF		
L5	INDUCTOR, RF, 270 UH +/-5%, 260 MA	186270	72259	WEE270	1		

Table 6-9. A3A2 10 MHz Reference PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
L6	INDUCTOR, 6 TURN	320911	89635	320911	REF		
L7	INDUCTOR, 6 TURN	320911	89635	320911	REF		
L8	INDUCTOR, 6 TURN	320911	89635	320911	REF		
L9	INDUCTOR, 6 TURN	320911	89635	320911	REF		
L10	INDUCTOR, 6 TURN	320911	89635	320911	REF		
P1	CONNECTOR, RECEPTACLE	544056	00779	50871-1	7		
Q1	TRANSISTOR, SI, PNP	195974	64713	2N3906	1		1
Q2⊘	TRANSISTOR, FET	403634	12040	J310	2		1
Q3⊘	TRANSISTOR, FET	403634	12040	J310	REF		
Q4	TRANSISTOR, SI, NPN	218081	04713	MPS6520	3		1
Q5	TRANSISTOR, SI, NPN	218081	04713	MPS6520	REF		
Q6	TRANSISTOR, SI, NPN	218081	04713	MPS6520	REF		
R1	RES, DEP. CAR, 1.5K +/-5%, 1/4W	343418	80031	CR251-4-5P1K5	1		
R2	RES, DEP. CAR, 390 +/-5%, 1/4W	441543	80031	CR251-4-5P390E	1		
R3	RES, DEP. CAR, 2.2K +/-5%, 1/4W	343400	80031	CR251-4-5P2K2	1		
R4	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	6		
R5	RES, DEP. CAR, 2.7K +/-5%, 1/4W	386490	80031	CR251-4-5P2K7	1		
R6	RES, DEP. CAR, 100 +/-5%, 1/4W	348771	80031	CR251-4-5P100E	2		
R7	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R8	RES, DEP. CAR, 1M +/-5%, 1/4W	348987	80031	CR251-4-5P1M	1		
R9	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	7		
R10	RES, DEP. CAR, 5.6K +/-5%, 1/4W	442350	80031	CR251-4-5P5K6	1		
R11	RES, COMP, 4.7K +/-5%, 1/4W	348821	01121	CB4725	4		
R12	RES, COMP, 4.7K +/-5%, 1/4W	348821	01121	CB4725	REF		
R13	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R14	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R15	RES, DEP. CAR, 56 +/-5%, 1/4W	342618	80031	CR251-4-5P56E	1		
R16	RES, MTL. FILM, 100K +/-1%, 1/8W	248807	91637	CMF551003F	1		
R17	RES, MTL. FILM, 15K +/-1%, 1/8W	285296	91637	CMF551502F	1		
R18	RES, DEP. CAR, 270 +/-5%, 1/4W	348789	80031	CR251-4-5P270E	3		
R19	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R20	RES, DEP. CAR, 47 +/-5%, 1/4W	441592	80031	CR251-4-5P47E	2		
R21	RES, DEP. CAR, 47 +/-5%, 1/4W	441592	80031	CR251-4-5P47E	REF		
R22	RES, DEP. CAR, 470 +/-5%, 1/4W	343434	80031	CR251-4-5P470E	2		
R23	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R24	RES, DEP. CAR, 330 +/-5%, 1/4W	368720	80031	CR251-4-5P330E	1		
R25	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R26	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R27	RES, DEP. CAR, 270 +/-5%, 1/4W	348789	80031	CR251-4-5P270E	REF		
R28	RES, DEP. CAR, 68 +/-5%, 1/4W	414532	80031	CR251-4-5P68E	1		
R29	RES, DEP. CAR, 130 +/-5%, 1/4W	442301	80031	CR251-4-5P130E	1		
R30	RES, DEP. CAR, 91 +/-5%, 1/4W	441683	80031	CR251-4-5P91E	1		
R31	RES, DEP. CAR, 430 +/-5%, 1/4W	441568	80031	CR251-4-5P430E	1		
R32	RES, DEP. CAR, 220 +/-5%, 1/4W	342626	80031	CR251-4-5P220E	1		
R33	RES, COMP, 4.7K +/-5%, 1/4W	348821	01121	CB4725	REF		
R35	RES, DEP. CAR, 3.3 +/-5%, 1/4W	348730	80031	CR251-4-5P3R3	1		
R36	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R37	RES, DEP. CAR, 20K +/-5%, 1/4W	441477	80031	CR251-4-5P20K	1		
R38	RES, COMP, 4.7K +/-5%, 1/4W	348821	01121	CB4725	REF		
R39	RES, DEP. CAR, 100 +/-5%, 1/4W	348771	80031	CR251-4-5P100E	REF		

Table 6-9. A3A2 10 MHz Reference PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
R40	RES, DEP. CAR. 33K +/-5%, 1/4W	348888	80031	CR251-4-5P3K3	1		
R41	RES, DEP. CAR. 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R42	RES, DEP. CAR. 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R43	RES, DEP. CAR. 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R44	RES, MTL. FILM, 6.04K +/-1%, 1/8W	285189	91637	CMF556041F	1		
R45	RES, DEP. CAR. 470 +/-5%, 1/4W	343434	80031	CR251-4-5P470E	REF		
R46	RES, DEP. CAR. 270 +/-5%, 1/4W	348789	80031	CR251-4-5P270E	REF		
R47	RES, DEP. CAR. 270 +/-5%, 1/4W	348789	80031	CR251-4-5P270E	1		
S1	SWITCH, SLIDE, DPDT	393629	10389	23-021-114	1	1	
TP1-TP4	TEST POINT	512889	02660	62395-1834	4		
U1	IC, TTL. QUAD 2-IN, NAND GATE	363580	01295	SN74S00N	3	1	
U2⊘	IC, COS/MOS, QUAD, BILATERAL SWITCH	363838	02735	CD4016AE	1	1	
U3	IC, LINEAR, OP-AMP	472779	12040	LF386N	1	1	
U4	IC, TTL, HEX INVERTER	288605	01295	SN7416N	1	1	
U5	IC, DUAL, "D" TYPE, EDGE TRIGGERED, F/F	418269	01295	SN74S74N	2	1	
U6⊘	IC, TTL, HEX INVERTER	393058	01295	SN74LS04N	1	1	
U7	IC, HI-SPEED ANALOG VOL COMPARATOR	386920	12040	LM361N	1	1	
U8	IC, TTL. QUAD 2-IN, NAND GATE	363580	01295	SN74S00N	REF		
U9⊘	IC, TTL, QUAD, 2-IN, POS-NAND GATE	393033	01295	SN74LS00N	1	1	
U10	IC, MSL, MONOSTBL MULTIVIBRATOR	293134	04713	MC8601P	2	1	
U11	IC, TTL, AND-OR-INVERT GATES	379289	01295	SN74S64N	1	1	
U12	IC, TTL, SCHOTTKY, HEX INVERTER	413617	01295	SN74S04N	1	1	
U13	IC, TTL. QUAD 2-IN, NAND GATE	363580	01295	SN74S00N	REF		
U14	IC, MSL, MONOSTBL MULTIVIBRATOR	293134	04713	MC8601P	REF		
U15	IC, DUAL, "D" TYPE, EDGE TRIGGERED, F/F	418269	01295	SN74S74N	REF		
W37	CABLE, RF	526723	89536	526723	2		
W40	CABLE, RF	526723	89536	526723	REF		
XU1	SOCKET, 14-PIN	370304	12040	MM74C906N	14		
XU2	SOCKET, 14-PIN	370304	12040	MM74C906N	REF		
XU3	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	1		
XU4	SOCKET, 14-PIN	370304	12040	MM74C906N	REF		
XU5	SOCKET, 14-PIN	370304	12040	MM74C906N	REF		
XU6	SOCKET, 14-PIN	370304	12040	MM74C906N	REF		
XU7	SOCKET, 14-PIN	370304	12040	MM74C906N	REF		
XU8	SOCKET, 14-PIN	370304	12040	MM74C906N	REF		
XU9	SOCKET, 14-PIN	370304	12040	MM74C906N	REF		
XU10	SOCKET, 14-PIN	370304	12040	MM74C906N	REF		
XU11	SOCKET, 14-PIN	370304	12040	MM74C906N	REF		
XU12	SOCKET, 14-PIN	370304	12040	MM74C906N	REF		
XU13	SOCKET, 14-PIN	370304	12040	MM74C906N	REF		
XU14	SOCKET, 14-PIN	370304	12040	MM74C906N	REF		
XU15	SOCKET, 14-PIN	370304	12040	MM74C906N	REF		
XY1	SOCKET, CRYSTAL	285262	71785	1-33-23-92-045	1		
Y1	CRYSTAL, 10 MHZ	536565	33096	PB1360	1	1	

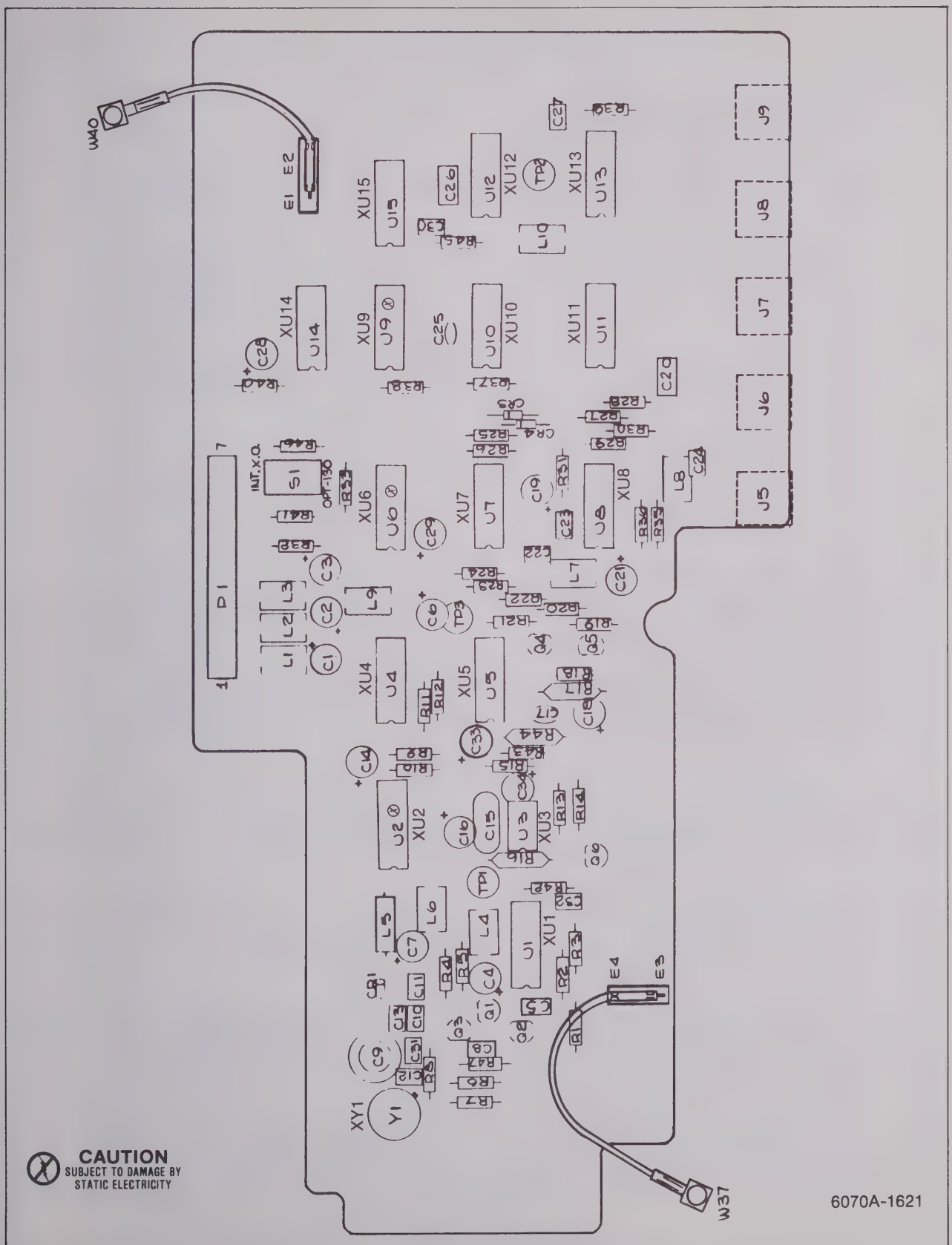


Figure 6-9. A3A2 10 MHz Reference PCB Assembly

Table 6-10. A3A3 Delay Discriminator PCB Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
A3A3⊗	DELAY DISCRIMINATOR PCB ASSEMBLY FIGURE 6-10 (6070A-4022T)	463653	89536	463653	REF		
C1	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	25		
C2	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C4	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	2		
C5	CAP, CER, 1.0 PF +/-0.25PF, 100V	512145	89536	512145	5		
C6	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C7	CAP, TA, 82 UF +/-20%, 20V	357392	12954	D82GS2D20M	3		
C8	CAP, TA, 22 UF +/-20%, 10V	474288	56289	195D223X0010TE4	1		
C9	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	21		
C10	CAP, CER, 470 PF +/-10%, 50V	513085	89536	513085	7		
C11	CAP, CER, 470 PF +/-10%, 50V	513085	89536	513085	REF		1
C13	CAP, CER, 470 PF +/-10%, 50V	513085	89536	513085	REF		1
C14	CAP, POLY, 0.10 UF +/-10%, 100V	393439	89536	393439	3		
C15	CAP, CER, 2.7 PF +/-0.25PF, 100V	363705	89536	363705	6		
C16	CAP, CER, 4.7 PF +/-0.25PF, 100V	362772	89536	363772	2		
C17	CAP, CER, 12 PF +/-2%, 100V	376871	89536	376871	2		
C18	CAP, CER, 12 PF +/-2%, 100V	376871	89536	376871	REF		
C19	CAP, CER, 2.7 PF +/-0.25PF, 100V	363705	89536	363705	REF		
C20	CAP, CER, 4.7 PF +/-0.25PF, 100V	362772	89536	363772	REF		
C21	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		1
C22	CAP, CER, 1.0 PF +/-0.25PF, 100V	512145	89536	512145	REF		1
C23	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		1
C24	CAP, CER, 1.0 PF +/-0.25PF, 100V	512145	89536	512145	REF		1
C25	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		1
C26	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C27	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C28	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C29	CAP, CER, 220 PF +/-5%, 100V	512111	89536	512111	1		
C30	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C31	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C32	CAP, POLY, 0.10 UF +/-10%, 100V	393439	89536	393439	REF		
C33	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C34	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C35	CAP, CER, 0.01 UF +/-20%, 100V	407361	72982	8121-A100-W5R-103M	3		
C36	CAP, FILM, 0.0022 UF +/-10%, 50V	313239	06001	75F1R5A322	1		
C37	CAP, TA, 15 UF 20V	519686	56289	196D156X0020KE4	2		
C38	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C39	CAP, POLY, 0.47 UF +/-10%, 100V	369124	89536	369124	3		
C40	CAP, POLY, 0.47 UF +/-10%, 100V	369124	89536	369124	REF		
C41	CAP, CER, 100 PF +/-2%, 100V	369173	80031	2222-638-1010	3		
C42	CAP, TA, 4.7 UF +/-20%, 50V	363721	56289	196D475X9015HA1	2		
C43	CAP, CER, 22 PF +/-2%, 100V	512871	89536	512871	1		
C44	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C45	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C46	CAP, MYLAR, 0.22 UF +/-10%, 100V	436113	73445	C280MAH/A220K	2		
C47	CAP, TA, 4.7 UF +/-20%, 50V	363721	56289	196D475X9015HA1	REF		
C48	CAP, POLY, 0.10 UF +/-10%, 100V	393439	89536	393439	REF		
C49	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		

Table 6-10. A3A3 Delay Discriminator PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
C50	CAP, POLY, 0.47 UF +/-10%, 100V	369124	89536	369124	REF		
C51	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C52	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C53	CAP, CER, 470 PF +/-10%, 50V	513085	89536	513085	REF		1
C54	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C55	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C56	CAP, TA, 15 UF 20V	519686	56289	196D156X0020KE4	REF		
C57	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C58	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C59	CAP, CER, 0.01 UF +/-20%, 100V	407361	72982	8121-A100-W5R-103M	REF		
C60	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C61	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C62	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C63	CAP, CER, 2.7 PF +/-0.25PF, 100V	363705	89536	363705	REF		1
C64	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C65	CAP, CER, 0.01 UF +/-20%, 100V	407361	72982	8121-A100-W5R-103M	REF		
C66	CAP, CER, 2.7 PF +/-0.25PF, 100V	363705	89536	363705	REF		1
C67	CAP, TA, 10 UF +/-20%, 35V	417683	56289	196D106X0035KA1	1		
C68	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		1
C69	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C70	CAP, CER, 1.0 PF +/-0.25PF, 100V	512145	89536	512145	REF		1
C71	CAP, CER, 470 PF +/-10%, 50V	513085	89536	513085	REF		1
C72	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C73	CAP, CER, 1.0 PF +/-0.25PF, 100V	512145	89536	512145	REF		
C74	CAP, CER, 100 PF +/-2%, 100V	369173	80031	2222-638-1010	REF		
C75	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C76	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C77	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C78	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		1
C79	CAP, CER, 2.7 PF +/-0.25PF, 100V	363705	89536	363705	REF		1
C80	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		1
C81	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C82	CAP, CER, 2.7 PF +/-0.25PF, 100V	363705	89536	363705	REF		1
C83	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C84	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C85	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C86	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C87	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C88	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C89	CAP, CER, 100 PF +/-2%, 100V	369173	80031	2222-638-1010	REF		
C90	CAP, TA, 82 UF +/-20%, 20V	357392	12954	D82GS2D20M	REF		
C91	CAP, TA, 82 UF +/-20%, 20V	357392	12954	D82GS2D20M	REF		
C92	CAP, MYLAR, 0.033 UF +/-10%, 250V	234492	73445	C280MAE/A33K	1		
C93	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C94	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C95	CAP, TA, 2.2 UF +/-20%, 20V	161927	56289	196D225X0020HA1	3		
C96	CAP, TA, 2.2 UF +/-20%, 20V	161927	56289	196D225X0020HA1	REF		
C97	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C98	CAP, CER, 470 PF +/-10%, 50V	513085	89536	513085	REF		
C99	CAP, CER, 470 PF +/-10%, 50V	513085	89536	513085	REF		

Table 6-10. A3A3 Delay Discriminator PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
C102	CAP, MYLAR, 0.22 UF +/-10%, 100V	436113	73445	C280MAH/A220K	REF		
C103	CAP, TA, 2.2 UF +/-20%, 20V	161927	56289	196D225X0020HA1	REF		
C104	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C105	CAP, TA, 68 UF 6V/8V	519702	56289	196D686X0008KE4	2		
C106	CAP, TA, 68 UF 6V/8V	519702	56289	196D686X0008KE4	REF		
CR1	DIODE, SI, SMALL SIGNAL	313247	28484	HP5082-6264	2	1	
CR2	DIODE, SI, SMALL SIGNAL	313247	28484	HP5082-6264	REF		
CR3	DIODE, RF ATTENUATING	508077	26629	KS8379	6	2	
CR4	DIODE, RF ATTENUATING	508077	26629	KS8379	REF		
CR5	DIODE, SI, HIGH-SPEED SWITCHING	203323	07910	1N4448	20	4	
CR6	DIODE, SET OF 6 (PART OF CR7-CR11)	508051	89536	508051	1	1	1
CR7	(PART OF CR6)						1
CR8	(PART OF CR6)				REF		1
CR9	(PART OF CR6)				REF		1
CR10	(PART OF CR6)				REF		1
CR11	(PART OF CR6)				REF		1
CR12	DIODE, SI, HIGH-SPEED SWITCHING	203323	07910	1N4448	REF		
CR13	DIODE, SI, HIGH-SPEED SWITCHING	203323	07910	1N4448	REF		
CR14	DIODE, SET OF 3 (PART OF CR15 & CR40)	508085	89536	508085	1	1	1
CR15	(PART OF CR14)						1
CR16	DIODE, ZENER	357848	04713	SZG20118	2	1	
CR17	DIODE, ZENER	357848	04713	SZG20118	REF		
CR18	DIODE, RF ATTENUATING	508077	26629	KS8379	REF		1
CR19	DIODE, RF ATTENUATING	508077	26629	KS8379	REF		1
CR20	DIODE, RF ATTENUATING	508077	26629	KS8379	REF		1
CR21	DIODE, RF ATTENUATING	508077	26629	KS8379	REF		1
CR22	DIODE, SI, HIGH-SPEED SWITCHING	203323	07910	1N4448	REF		
CR23	DIODE, SI, HIGH-SPEED SWITCHING	203323	07910	1N4448	REF		
CR24	DIODE, SMALL SIGNAL	402776	28480	HP3379	4	1	1
CR25	DIODE, SMALL SIGNAL	402776	28480	HP3379	REF		1
CR26	DIODE, SMALL SIGNAL	402776	28480	HP3379	REF		1
CR27	DIODE, SMALL SIGNAL	402776	28480	HP3379	REF		1
CR28	DIODE, SI, HIGH-SPEED SWITCHING	203323	07910	1N4448	REF		
CR29	DIODE, SI, HIGH-SPEED SWITCHING	203323	07910	1N4448	REF		
CR30	DIODE, SI, HIGH-SPEED SWITCHING	203323	07910	1N4448	REF		
CR31	DIODE, SI, HIGH-SPEED SWITCHING	203323	07910	1N4448	REF		
CR32	DIODE, SI, HIGH-SPEED SWITCHING	203323	07910	1N4448	REF		
CR33	DIODE, SI, HIGH-SPEED SWITCHING	203323	07910	1N4448	REF		
CR34	DIODE, SI, HIGH-SPEED SWITCHING	203323	07910	1N4448	REF		
CR35	DIODE, SI, HIGH-SPEED SWITCHING	203323	07910	1N4448	REF		
CR36	DIODE, SI, HIGH-SPEED SWITCHING	203323	07910	1N4448	REF		
CR37	DIODE, SI, HIGH-SPEED SWITCHING	203323	07910	1N4448	REF		
CR38	DIODE, SI, HIGH-SPEED SWITCHING	203323	07910	1N4448	REF		
CR39	DIODE, SI, HIGH-SPEED SWITCHING	203323	07910	1N4448	REF		
CR40	--(PART OF CR14)						
CR41	DIODE, SI, HIGH-SPEED SWITCHING	203323	07910	1N4448	REF		
CR42	DIODE, SI, HIGH-SPEED SWITCHING	203323	07910	1N4448	REF		
CR43	DIODE, SI, HIGH-SPEED SWITCHING	203323	07910	1N4448	REF		
CR44	DIODE, ZENER	159798	04713	1N751A	2	1	
CR45	DIODE, ZENER	159798	04713	1N751A	REF		

Table 6-10. A3A3 Delay Discriminator PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
J1	CONNECTOR, POST	267500	00779	87022-1	7		
J2	CONNECTOR, POST	267500	00779	87022-1	REF		
J3	CONNECTOR, POST	267500	00779	87022-1	REF		
J10	CONNECTOR, RF, SMA	512087	16733	705147-001	1		
K1	RELAY, DPDT	407536	71482	HFW1230K05	1		
K2	RELAY, SPST, 3W, 28VDC	461434	15636	R7254-1	3		
K3	RELAY, SPST, 3W, 28VDC	461434	15636	R7254-1	REF		
K4	RELAY, SPST, 3W, 28VDC	461434	15636	R7254-1	REF		
L1	INDUCTOR, 0.47 UH +/-10%, 1060 mA	320929	24759	MR0.47	9		1
L2	INDUCTOR, 0.47 UH +/-10%, 1060 mA	320929	24759	MR0.47	REF		1
L3	INDUCTOR, 0.47 UH +/-10%, 1060 mA	320929	24759	MR0.47	REF		1
L4	INDUCTOR, 0.47 UH +/-10%, 1060 mA	320929	24759	MR0.47	REF		1
L6	INDUCTOR, 0.1 UH	257154	24759	MR-0.10	3		1
L7	INDUCTOR, 0.1 UH	257154	24759	MR-0.10	REF		1
L8	INDUCTOR, 0.1 UH	257154	24759	MR-0.10	REF		1
L18	INDUCTOR, 0.47 UH +/-10%, 1060 mA	320929	24759	MR0.47	REF		1
L19	INDUCTOR, 0.47 UH +/-10%, 1060 mA	320929	24759	MR0.47	REF		1
L20	INDUCTOR, 0.47 UH +/-10%, 1060 mA	320929	24759	MR0.47	REF		1
L21	INDUCTOR, 0.47 UH +/-10%, 1060 mA	320929	24759	MR0.47	REF		
L22	INDUCTOR, 0.47 UH +/-10%, 1060 mA	320929	24759	MR0.47	REF		
L23	INDUCTOR, 0.22 UH, 2050 mA	261735	24759	MR0.22	1		
MP1	INSERTS, BOARD (NOT SHOWN)	376418	89536	376418	67		
MP2	AIDE, PCB PULL	541730	89536	541730	4		
MP3	HEADER, DIODE	607747	89536	607747	1		
P1	COMPONENT LEAD, SPRING TYPE	544056	89536	544056	15		
Q1	TRANSISTOR, SI, PNP	225599	07263	2N4250	2	1	
Q2	TRANSISTOR, SI, PNP	225599	07263	2N4250	REF		
Q3	TRANSISTOR, SI, NPN	346916	89536	346916	1	1	
Q4⊗	TRANSISTOR, D-MOS	507905	18324	SD305EE	3	1	
Q5⊗	TRANSISTOR, D-MOS	507905	18324	SD305EE	REF		
Q6	TRANSISTOR, DUAL, NPN	478099	12040	LM3940M	1	1	
Q7	TRANSISTOR, FIELD EFFECT	477729	18324	SD213EE	1	1	
Q9⊗	TRANSISTOR, D-MOS	507905	18324	SD305EE	REF		
Q10	TRANSISTOR, SI, NPN	218396	04713	2N3904	1	1	
Q11	TRANSISTOR, SI, PNP	402586	04713	2N2905A	1	1	
R1	RES, DEP. CAR, 4.7 +/-5%, 1/4W	441584	80031	CR251-4-5P4E7	1		
R2	RES, DEP. CAR, 430 +/-5%, 1/4W	441568	80031	CR251-4-5P430E	2		
R3	RES, DEP. CAR, 390 +/-5%, 1/4W	441543	80031	CR251-4-5P390E	2		
R4	RES, DEP. CAR, 330 +/-5%, 1/4W	368720	80031	CR251-4-5P330E	2		
R5	RES, DEP. CAR, 680 +/-5%, 1/4W	368779	80031	CR251-4-5P680E	3		
R6	RES, COMP, 47 +/-5%, 1/8W	512061	01121	BB4705	3		1
R7	RES, DEP. CAR, 10 +/-5%, 1/4W	340075	80031	CR251-4-5P10E	3		
R8	RES, DEP. CAR, 68 +/-5%, 1/4W	414532	80031	CR251-4-5P68E	1		
R9	RES, DEP. CAR, 47 +/-5%, 1/4W	441592	80031	CR251-4-5P47E	4		
R10	RES, DEP. CAR, 11 +/-5%, 1/4W	442160	80031	CR251-4-5P11E	2		
R11	RES, DEP. CAR, 11 +/-5%, 1/4W	442160	80031	CR251-4-5P11E	REF		
R12	RES, DEP. CAR, 110 +/-5%, 1/4W	442285	80031	CR251-4-5P11E	1		
R13	RES, MTL. FILM, 3.92K +/-1%, 1/8W	294801	91637	CMF553921F	1		
R14	RES, MTL. FILM, 14.7K +/-1%, 1/8W	226225	91637	CMF551472F	3		
R15	RES, DEP. CAR, 560 +/-5%, 1/4W	385948	80031	CR251-4-5P560E	1		

Table 6-10. A3A3 Delay Discriminator PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
R16	RES, MTL. FILM, 14.7K +/-1%, 1/8W	226225	91637	CMF551472F	REF		
R17	RES, DEP. CAR. 39K +/-5%, 1/4W	442400	80031	CR251-4-5P39K	1		
R18	RES, MTL. FILM, 14.7K +/-1%, 1/8W	226225	91637	CMF551472F	REF		
R19	RES, DEP. CAR. 4.7K +/-5%, 1/4W	348821	80031	CR251-4-5P4K7	4		
R20	RES, DEP. CAR, 1.5M +/-5%, 1/4W	349001	80031	CR251-4-5P1M5	1		
R21	RES, DEP. CAR. 10 +/-5%, 1/4W	340075	80031	CR251-4-5P10E	REF		
R22	RES, DEP. CAR. 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	4		
R23	RES, DEP. CAR. 470K +/-5%, 1/4W	342634	80031	CR251-4-5P470K	1		1
R24	RES, VAR. 25K +/-10%, 1/2W	494591	11236	360T-253A	3		1
R25	RES, DEP. CAR. 12K +/-5%, 1/4W	348847	80031	CR251-4-5P12K	1		
R26	RES, DEP. CAR. 100K +/-5%, 1/4W	348920	80031	CR251-4-5P100K	1		
R27	RES, DEP. CAR, 100 +/-5%, 1/4W	348771	80031	CR251-4-5P100E	4		
R28	RES, DEP. CAR. 47K +/-5%, 1/4W	348896	80031	CR251-4-5P47K	4		
R29	RES, DEP. CAR, 430 +/-5%, 1/4W	441568	80031	CR251-4-5P430E	REF		
R30	RES, DEP. CAR. 47 +/-5%, 1/4W	441592	80031	CR251-4-5P47E	REF		1
R31	RES, DEP. CAR. 20K +/-5%, 1/4W	441477	80031	CR251-4-5P20K	1		1
R32	RES, MTL. FILM, 7.50K +/-1%, 1/8W	223529	91637	CMF557501F	2		
R33	RES, MTL. FILM, 3.74K +/-1%, 1/8W	272096	91637	CMF553741F	1		
R34	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	9		
R35	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R36	RES, COMP, 47 +/-5%, 1/8W	512061	01121	BB4705	REF		
R37	RES, DEP. CAR, 100 +/-5%, 1/4W	348771	80031	CR251-4-5P100E	REF		
R40	RES, DEP. CAR, 100 +/-5%, 1/4W	348771	80031	CR251-4-5P100E	REF		
R41	RES, COMP, 51 +/-5%, 1/8W	266262	01121	BB5105	2		
R42	RES, COMP, 47 +/-5%, 1/8W	512061	01121	BB4705	REF		
R43	RES, MTL. FILM, 1.65K +/-1%, 1/8W	293662	91637	CMF551651F	1		
R44	RES, MTL. FILM, 825 +/-1%, 1/8W	294892	91637	CMF558250F	1		
R45	RES, VAR. 200 +/-10%, 1/2W	275743	89536	275743	1		
R46	RES, DEP. CAR. 47 +/-5%, 1/4W	441592	80031	CR251-4-5P47E	REF		1
R47	RES, DEP. CAR. 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R48	RES, VAR. 1M +/-10%, 1/2W	276691	89536	276691	2		1
R49	RES, DEP. CAR. 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R50	RES, VAR. 1M +/-10%, 1/2W	276691	89536	276691	REF		1
R51	RES, DEP. CAR. 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R52	RES, DEP. CAR, 16K +/-5%, 1/4W	442376	80031	CR251-4-5P16K	1		
R53	RES, VAR. 25K +/-10%, 1/2W	494591	11236	360T-253A	REF		
R54	RES, MTL. FILM, 7.50K +/-1%, 1/8W	223529	91637	CMF557501F	REF		
R55	RES, DEP. CAR, 680 +/-5%, 1/4W	368779	80031	CR251-4-5P680E	REF		
R56	RES, MTL. FILM, 10.0K +/-1%, 1/8W	168260	91637	CMF551002F	2		
R57	RES, DEP. CAR. 620 +/-5%, 1/4W	442319	80031	CR251-4-5P620E	2		
R58	RES, COMP, 51 +/-5%, 1/8W	266262	01121	BB5105	REF		
R59	RES, MTL. FILM, 3.83K +/-1%, 1/8W	235143	91637	CMF553831F	1		
R60	RES, MTL. FILM, 2.49K +/-1%, 1/8W	226209	91637	CMF552491F	3		
R61	RES, MTL. FILM, 12.4K +/-1%, 1/8W	261644	91637	CMF551242F	1		
R62	RES, DEP. CAR. 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R63	RES, MTL. FILM, 8.25K +/-1%, 1/8W	294959	91637	CMF558251F	1		
R64	RES, MTL. FILM, 1M +/-1%, 1/8W	268797	91637	CMF551004F	1		
R65	RES, DEP. CAR. 1.5K +/-5%, 1/4W	343418	80031	CR251-4-5P1K5	2		
R66	RES, DEP. CAR. 3.3K +/-5%, 1/4W	348813	80031	CR251-4-5P3K3	2		
R67	RES, VAR. 25K +/-10%, 1/2W	494591	11236	360T-253A	REF		

Table 6-10. A3A3 Delay Discriminator PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
R68	RES, MTL. FILM, 1.5K +/-1%, 1/8W	313098	91637	CMF551501F	1		
R69	RES, DEP. CAR. 30 +/-5%, 1/4W	442228	80031	CR251-4-5P30E	2		
R70	RES, MTL. FILM, 499 +/-1%, 1/8W	168211	91637	CMF554990F	3		
R71	RES, MTL. FILM, 10.0K +/-1%, 1/8W	168260	91637	CMF551002F	REF		
R72	RES, MTL. FILM, 54.9 +/-1%, 1/8W	305920	91637	CMF5554R9E	1		
R73	RES, DEP. CAR. 330 +/-5%, 1/4W	368720	80031	CR251-4-5P330E	REF		
R74	RES, MTL. FILM, 16.9K +/-1%, 1/8W	267146	91637	CMF551692F	1		
R75	RES, MTL. FILM, 100K +/-1%, 1/8W	248807	91637	CMF551003F	3		
R76	RES, MTL. FILM, 100K +/-1%, 1/8W	248807	91637	CMF551003F	REF		
R77	RES, MTL. FILM, 100K +/-1%, 1/8W	248807	91637	CMF551003F	REF		
R78	RES, DEP. CAR. 4.7K +/-5%, 1/4W	348821	80031	CR251-4-5P4K7	REF		
R79	RES, DEP. CAR. 8.2K +/-5%, 1/4W	441675	80031	CR251-4-5P8K2	1		
R80	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R81	RES, DEP. CAR, 11K +/-5%, 1/4W	441360	80031	CR251-4-5P11K	1		
R82	RES, DEP. CAR. 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R83	RES, MTL. FILM, 499 +/-1%, 1/8W	168211	91637	CMF554990F	REF		
R84	RES, MTL. FILM, 3.16K +/-1%, 1/8W	235291	91637	CMF553161F	1		
R85	RES, DEP. CAR, 30 +/-5%, 1/4W	442228	80031	CR251-4-5P30E	REF		
R86	RES, VAR. 10K +/-10%, 1/2W	309674	75378	360T-103A	1		
R89	RES, DEP. CAR. 150K +/-5%, 1/4W	348938	80031	CR251-4-5P150K	2		
R90	RES, MTL. FILM, 499 +/-1%, 1/8W	168211	91637	CMF554990F	REF		
R91	RES, MTL. FILM, 2.49K +/-1%, 1/8W	226209	91637	CMF552491F	REF		
R92	RES, MTL. FILM, 2.49K +/-1%, 1/8W	226209	91637	CMF552491F	REF		
R93	RES, MTL. FILM, 14 +/-1%, 1/8W	494484	91637	CMF5514R0F	1		
R95	RES, COMP, 750 +/-5%, 1/2W	108894	01121	EB7515	1		
R96	RES, MTL. FILM, 150 +/-1%, 1/8W	448555	91637	CMF551500F	1		
R97	RES, DEP. CAR. 620 +/-5%, 1/4W	442319	80031	CR251-4-5P620E	REF		
R99	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R100	RES, DEP. CAR, 2.4K +/-5%, 1/4W	441493	80031	CR251-4-5P2K4	1		
R103	RES, VAR. 500 +/-10%, 1/2W	520783	32997	3299W-CR2-501	1		
R104	RES, DEP. CAR. 200K +/-5%, 1/4W	441485	80031	CR251-4-5P200K	2		
R105	RES, DEP. CAR. 47 +/-5%, 1/4W	441592	80031	CR251-4-5P47E	REF		
R106	RES, MTL. FILM, 1.00K +/-1%, 1/8W	168229	91637	CMF551001F	4		
R107	RES, DEP. CAR, 1M +/-5%, 1/4W	348987	80031	CR251-4-5P1M	2		
R108	RES, DEP. CAR, 10 +/-5%, 1/4W	340075	80031	CR251-4-5P10E	REF		
R109	RES, DEP. CAR. 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R110	RES, VAR. 100 +/-10%, 1/2W	381913	32997	3299W-CR2-101	1		1
R113	RES, DEP. CAR. 0.5 +/-5%, 1/4W	381954	80031	CR251-4-5P0.5E	1		
R114	RES, MTL. FILM, 73.2K +/-1%, 1/8W	237222	91637	CMF557322F	1		
R115	RES, DEP. CAR, 3K +/-5%, 1/4W	441527	80031	CR251-4-5P3K	1		
R116	RES, DEP. CAR. 200 +/-5%, 1/4W	441451	80031	CR251-4-5P200E	1		
R117	RES, DEP. CAR, 47K +/-5%, 1/4W	348896	80031	CR251-4-5P47K	REF		
R118	RES, DEP. CAR, 47K +/-5%, 1/4W	348896	80031	CR251-4-5P47K	REF		
R119	RES, DEP. CAR, 150K +/-5%, 1/4W	348938	80031	CR251-4-5P150K	REF		
R120	RES, DEP. CAR. 4.7K +/-5%, 1/4W	348821	80031	CR251-4-5P4K7	REF		
R121	RES, DEP. CAR, 2K +/-5%, 1/4W	441469	80031	CR251-4-5P2K	1		
R122	RES, MTL. FILM, 143 +/-1%, 1/8W	192906	91637	CMF551430F	1		
R123	RES, MTL. FILM, 137 +/-1%, 1/8W	235218	91637	CMF551370F	1		
R124	RES, DEP. CAR, 15 +/-5%, 1/4W	348755	80031	CR251-4-5P15E	1		
R125	RES, MTL. FILM, 1.00K +/-1%, 1/8W	168229	91637	CMF551001F	REF		

Table 6-10. A3A3 Delay Discriminator PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
R126	RES, MTL. FILM, 1.00K +/-1%, 1/8W	168229	91637	CMF551001F	REF		
R127	RES, MTL. FILM, 1.00K +/-1%, 1/8W	168229	91637	CMF551001F	REF		
R128	RES, DEP. CAR, 200K +/-5%, 1/4W	441485	80031	CR251-4-5P200K	REF		
R129	RES, DEP. CAR. 390K +/-5%, 1/4W	442475	80031	CR251-4-5P390K	1		
R131	RES, DEP. CAR. 120K +/-5%, 1/4W	441386	80031	CR251-4-5P120K	1		
R132	RES, DEP. CAR, 1M +/-5%, 1/4W	348987	80031	CR251-4-5P1M	REF		
R133	RES, DEP. CAR, 110K +/-5%, 1/4W	442426	80031	CR251-4-5P110K	1		
R134	RES, COMP, 270 +/-5%, 1/2W	159616	01121	EB2715	1		
R135	RES, DEP. CAR. 100 +/-5%, 1/4W	348771	80031	CR251-4-5P100E	REF		
R136	RES, DEP. CAR. 390 +/-5%, 1/4W	441543	80031	CR251-4-5P390E	REF		
R137	RES, DEP. CAR, 47K +/-5%, 1/4W	348896	80031	CR251-4-5P47K	REF		
R138	RES, DEP. CAR, 4.7K +/-5%, 1/4W	348821	80031	CR251-4-5P4K7	REF		
R139	RES, DEP. CAR. 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R140	RES, DEP. CAR, 3.3K +/-5%, 1/4W	348813	80031	CR251-4-5P3K3	REF		
R141	RES, DEP. CAR, 1.5K +/-5%, 1/4W	343418	80031	CR251-4-5P1K5	REF		
R142	RES, DEP. CAR. 680 +/-5%, 1/4W	368779	80031	CR251-4-5P680E	REF		
R143	RES, DEP. CAR. 56K +/-5%, 1/4W	441626	80031	CR251-4-5P56K	1		
R144	RES, DEP. CAR, 9.1K +/-5%, 1/4W	441691	80031	CR251-4-5P9K1	1		
R145	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R146	RES, VAR. 50K +/-10%, 1/2W	335778	11236	360T-503A	1		
R147	RES, MTL. FILM, 124K +/-1%, 1/8W	288407	91637	CMF551243F	1		
R148	RES, MTL. FILM, 36.5K +/-5%, 1/8W	235309	91637	CMF553652F	1		
R149	RES, MTL. FILM, 27.4K +/-1%, 1/8W	241471	91637	CMF552742F	1		
S1	SWITCH, SLIDE, DPDT	393629	10389	23-021-114	1	1	
T1	TRANSFORMER, DIRECT COUPLER	514414	89536	514414	2		1
T2	TRANSFORMER, DIRECT COUPLER	514414	89536	514414	REF		1
T3	TRANSFORMER, STEP-UP	514406	89536	514406	1		1
TP1-TP6	CONNECTOR, TEST POINT	512889	00779	62395-1	6		
U1	IC, HYBRID, 8DB POWER AMP	492801	89536	492801	3	1	
U2	IC, HYBRID, 8DB POWER AMP	492801	89536	492801	REF		
U3	IC, HYBRID, 8DB POWER AMP	492801	89536	492801	REF		
U4	IC, OP-AMP, LO-NOISE	477745	18324	NE5534AN	2	1	
U5	IC, LINEAR, OP-AMP, J-FET INPUT	454454	89536	454454	4	1	1
U6	MIXER, TFM-2	512103	89536	512103	1	1	1
U7	IC, LINEAR, OP-AMP, J-FET INPUT	454454	89536	454454	REF		
U8	IC, LINEAR, OP-AMP, J-FET INPUT	454454	89536	454454	REF		
U9	RESISTOR NETWORK, 10K	500710	89536	500710	1	1	
U10	IC, LINEAR, OP-AMP, J-FET INPUT	454454	89536	454454	REF		
U11	IC, LINEAR, OP-AMP	472779	12040	LF386N	2	1	
U12	IC, LINEAR, OP-AMP	472779	12040	LF386N	REF		
U13	IC, LINEAR, TIMER	402610	18324	NE555N	1	1	
U14	IC, OP-AMP, LO-NOISE	477745	18324	NE5534AN	REF		
U15	RESISTOR NETWORK	380618	89536	380618	1	1	
U16	IC, LINEAR, QUAD COMPARATOR	387233	12040	LM339N	2	1	
U17	IC, HYBRID MOD ATTEN	496950	89536	496950	1	1	
U18	IC, LINEAR, D-MOS FET QUAD ANALOG	507228	18324	SD50021J	1	1	
U19	RESISTOR NETWORK, 10K	412924	89536	412924	1	1	
U20	IC, LINEAR, QUAD COMPARATOR	387233	12040	LM339N	REF		
U21	IC, TTL, SCHOTTKY 3-8 LINE DECODER	407585	01295	SN74LS138N	1	1	
U22	IC, TTL, HEX INVERTER	407593	01295	SN7406N	1	1	

Table 6-10. A3A3 Delay Discriminator PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
U23	HYBRID, 7 DB POWER AMP	492751	89536	492751	1	1	1
W1	HYBRID COUPLER, 3T	526517	89536	526517	1		
W2	HYBRID COUPLER	526558	89536	526558	1		1
W3	HYBRID COUPLER, 3T	526525	89536	526525	1		1
W31	CABLE ASSEMBLY, SEMI-RIGID	524710	89536	524710	1		
W32	CABLE ASSEMBLY, SEMI-RIGID	524728	89536	524728	1		
W33	CABLE ASSEMBLY, DD TO VCO	538249	89536	538249	1		
XQ1	SOCKET, TRANSISTOR	285262	71785	1-33-23-92-045	2		
XQ2	SOCKET, TRANSISTOR	285262	71785	1-33-23-92-045	REF		
XQ6	SOCKET, TRANSISTOR, 8-PIN	408450	89536	408450	1		
XU4	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	9		
XU5	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	REF		
XU7	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	REF		
XU8	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	REF		
XU9	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	4		
XU10	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	REF		
XU11	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	REF		
XU12	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	REF		
XU13	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	REF		
XU14	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	REF		
XU15	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU16	SOCKET, IC, 14-PIN	370304	12040	MM74C906N	3		
XU18	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU20	SOCKET, IC, 14-PIN	370304	12040	MM74C906N	REF		
XU21	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU22	SOCKET, IC, 14-PIN	370304	12040	MM74C906N	REF		

1 THESE COMPONENTS IF ADJUSTED OR REPLACED, REQUIRE REPROGRAMMING OF THE CALIBRATION EPROM. IF YOUR FACILITY IS NOT EQUIPT TO REPROGRAM THE CALIBRATION EPROM, CONTACT YOUR NEAREST FLUKE SERVICE CENTER.

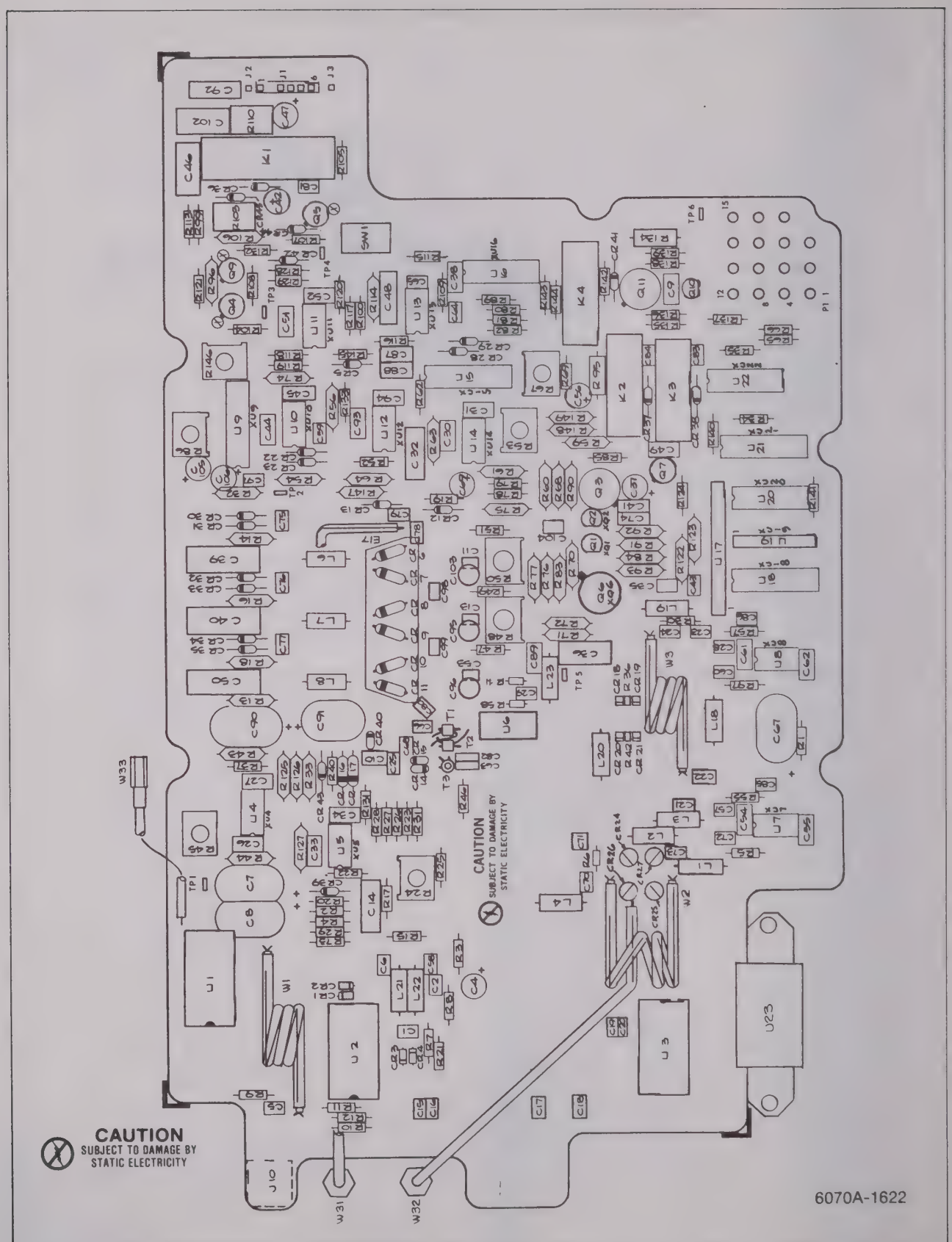


Figure 6-10. A3A3 Delay Discriminator PCB Assembly

Table 6-11. A3A4 N/1 Divider PCB Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
A3A4	N/1 DIVIDER PCB ASSEMBLY FIGURE 6-11 (6070A-4010-12T)	463547	89536	463547	REF		
C1	CAP, TA, 2.2 UF +/-20%, 20V	161927	56289	1962225X0020HA1	3		
C2	CAP, TA, 2.2 UF +/-20%, 20V	161927	56289	1962225X0020HA1	REF		
C3	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	1		
C4	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	8		
C5	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C6	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C7	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C8	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C9	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C10	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C11	CAP, TA, 2.2 UF +/-20%, 20V	161927	56289	196D2225X0020HA1	REF		
C13	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
CR1	DIODE, SI, SWITCHING	313247	28480	HP5082-6264	3	1	
CR2	DIODE, SI, SWITCHING	313247	28480	HP5082-6264	REF		
CR3	DIODE, SI, SWITCHING	313247	28480	HP5082-6264	REF		
J1	CONNECTOR, RF, SMB	512095	16733	702033	1		
J2	CONNECTOR, RF, SMB	352450	98291	51-051-0000	1		
J13	CONNECTOR, RF, SMA	512087	16733	705147-001	1		
L1	CHOKE, 6-TURN	320911	89536	320911	2		
L2	CHOKE, 6-TURN	320911	89536	320911	REF		
MP1	SOCKET, COMPONENT LEAD (NOT SHOWN)	376418	22526	75060-007	64		
P1-P2	COMPONENT LEAD, SPRING TYPE	544056	00779	50871-1	19		
Q1	TRANSISTOR, SI, PNP	226290	04713	MPS3640	2	1	
Q2	TRANSISTOR, SI, PNP	226290	04713	MPS3640	REF		
Q3	TRANSISTOR, SI, NPN	248351	04713	MPS918	1	1	
R1	RES, COMP, 47 +/-10%, 1/8W	272211	01121	BB4701	2		
R2	RES, COMP, 47 +/-10%, 1/8W	272211	01121	BB4701	REF		
R3	RES, COMP, 220 +/-10%, 1/8W	153957	01121	BB2211	2		
R4	RES, COMP, 220 +/-10%, 1/8W	153957	01121	BB2211	REF		
R5	RES, COMP, 10 +/-10%, 1/8W	321125	01121	BB1001	2		
R6	RES, COMP, 10 +/-10%, 1/8W	321125	01121	BB1001	REF		
R7	RES, DEP. CAR, 560 +/-5%, 1/4W	385948	80031	CR251-4-5P561E	6		
R8	RES, DEP. CAR, 560 +/-5%, 1/4W	385948	80031	CR251-4-5P561E	REF		
R9	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	1		
R10	RES, DEP. CAR, 560 +/-5%, 1/4W	385948	80031	CR251-4-5P561E	REF		
R11	RES, DEP. CAR, 91 +/-5%, 1/4W	441683	80031	CR251-4-5P91E	1		
R12	RES, DEP. CAR, 150 +/-5%, 1/4W	343442	80031	CR251-4-5P150E	2		
R13	RES, DEP. CAR, 430 +/-5%, 1/4W	441568	80031	CR251-4-5P431E	1		
R14	RES, DEP. CAR, 560 +/-5%, 1/4W	385948	80031	CR251-4-5P561E	REF		
R15	RES, DEP. CAR, 560 +/-5%, 1/4W	385948	80031	CR251-4-5P561E	REF		
R16	RES, DEP. CAR, 560 +/-5%, 1/4W	385948	80031	CR251-4-5P561E	REF		
R17	RES, DEP. CAR, 470 +/-5%, 1/4W	343434	80031	CR251-4-5P471E	2		
R18	RES, DEP. CAR, 470 +/-5%, 1/4W	343434	80031	CR251-4-5P471E	REF		
R19	RES, DEP. CAR, 39 +/-5%, 1/4W	340836	80031	CR251-4-5P39E	1		
R20	RES, DEP. CAR, 10 +/-5%, 1/4W	340075	80031	CR251-4-5P10E	1		
R21	RES, DEP. CAR, 100 +/-5%, 1/4W	348771	80031	CR251-4-5P100E	1		
R22	RES, DEP. CAR, 150 +/-5%, 1/4W	343442	80031	CR251-4-5P150E	REF		

Table 6-11. A3A4 N/1 Divider PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
R23	RES, DEP. CAR, 4.7K +/-5%, 1/4W	348821	80031	CR251-4-5P4K7	6		
R24	RES, DEP. CAR, 390 +/-5%, 1/4W	441543	80031	CR251-4-5P390E	1		
R25	RES, DEP. CAR, 4.7K +/-5%, 1/4W	348821	80031	CR251-4-5P4K7	REF		
R26	RES, DEP. CAR, 4.7K +/-5%, 1/4W	348821	80031	CR251-4-5P4K7	REF		
R27	RES, DEP. CAR, 4.7K +/-5%, 1/4W	348821	80031	CR251-4-5P4K7	REF		
R28	RES, DEP. CAR, 4.7K +/-5%, 1/4W	348821	80031	CR251-4-5P4K7	REF		
R29	RES, DEP. CAR, 4.7K +/-5%, 1/4W	348821	80031	CR251-4-5P4K7	REF		
R30	RES, COMP, 100 +/-10%, 1/8W	261826	01121	BB1011	1		
S1	SWITCH, SLIDE, DPDT	393629	10389	23-021-114	1	1	
TP1-TP3	TEST POINT	512889	02660	62395-1834	6		
TP5-TP7	TEST POINT	512889	02660	62395-1834	REF		
U1	IC, 8-BIT ADDRESSABLE LATCH	419242	01295	SN74LS259N	2	1	
U2	IC, 8-BIT ADDRESSABLE LATCH	419242	01295	SN74LS259N	REF		
U3	IC, TTL LO-PWR SCHTKY OCTAL "D" TYPE F/F	454892	01295	SN74LS273N	2	1	
U4	IC, TTL, QUAD, 2-INPUT, POS NAND GATE	393033	01295	SN74LS00N	1	1	
U5	IC, TTL DUAL D-TYPE FLIP/FLOP	393124	01295	SN74LS74N	2	1	
U6	IC, TTL DUAL D-TYPE FLIP/FLOP	393124	01295	SN74LS74N	REF		
U7	IC, TTL, HEX INVERTER	393058	01295	SN74LS04N	1	1	
U8	IC, TTL, SYNC DECADE RATE MULTIPLIER	454884	01295	SN74167N	1	1	
U9	IC, TTL LO-PWR SCHTKY OCTAL "D" TYPE F/F	454892	01295	SN74LS273N	REF		
U10	IC, TTL, QUAD, 2-INPUT NOR GATE	393041	01295	SN74LS02N	1	1	
U11	RESISTOR NETWORK, 4.7K	494690	89536	494690	2	1	
U12	RESISTOR NETWORK, 4.7K	494690	89536	494690	REF		
U13	IC, ECL, 2-MOD PRESCALER, PHASE LOCKED	454900	89536	454900	1	1	
U14	IC, ECL, UNIVERSAL DECADE COUNTER	525329	18324	10137F	3	1	
U15	IC, ECL, UNIVERSAL DECADE COUNTER	525329	18324	10137F	REF		
U16	IC, ECL, UNIVERSAL DECADE COUNTER	525329	18324	10137F	REF		
U17	IC, ECL, DUAL TYPE "D", M-S, F-F	525345	04713	MC10231L	1	1	
U18	RESISTOR NETWORK, 510 +/-2%, 1/8W	459974	89536	459974	1	1	
U19	IC, ECL, QUAD, 2-INPUT NOR, 16-PIN DIP	380881	04713	MC10102P	1	1	
U20	IC, DUAL, "D" TYPE, EDGE TRIGGERED, F/F	418269	01295	SN74S74N	1	1	
XU1	SOCKET, IC, 16-PIN DIP	370312	91506	316-AG39D	5		
XU2	SOCKET, IC, 16-PIN DIP	370312	91506	316-AG39D	REF		
XU3	SOCKET, IC, 20-PIN	454421	01295	C932002	2		
XU4	SOCKET, IC, 14-PIN	370304	12040	MM74C906N	6		
XU5	SOCKET, IC, 14-PIN	370304	12040	MM74C906N	REF		
XU6	SOCKET, IC, 14-PIN	370304	12040	MM74C906N	REF		
XU7	SOCKET, IC, 14-PIN	370304	12040	MM74C906N	REF		
XU8	SOCKET, IC, 16-PIN DIP	370312	91506	316-AG39D	REF		
XU9	SOCKET, IC, 20-PIN	454421	01295	C932002	REF		
XU10	SOCKET, IC, 14-PIN	370304	12040	MM74C906N	REF		
XU17	SOCKET, IC, 16-PIN DIP	370312	91506	316-AG39D	REF		
XU19	SOCKET, IC, 16-PIN DIP	370312	91506	316-AG39D	REF		
XU20	SOCKET, IC, 14-PIN	370304	12040	MM74C906N	REF		

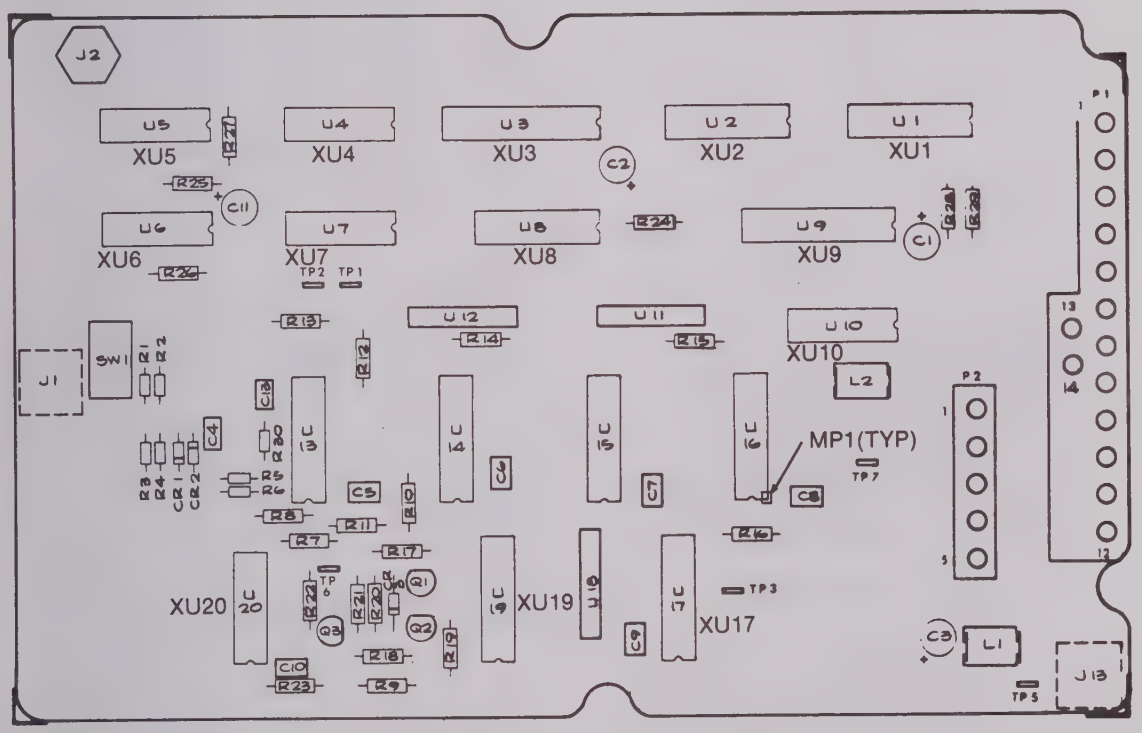


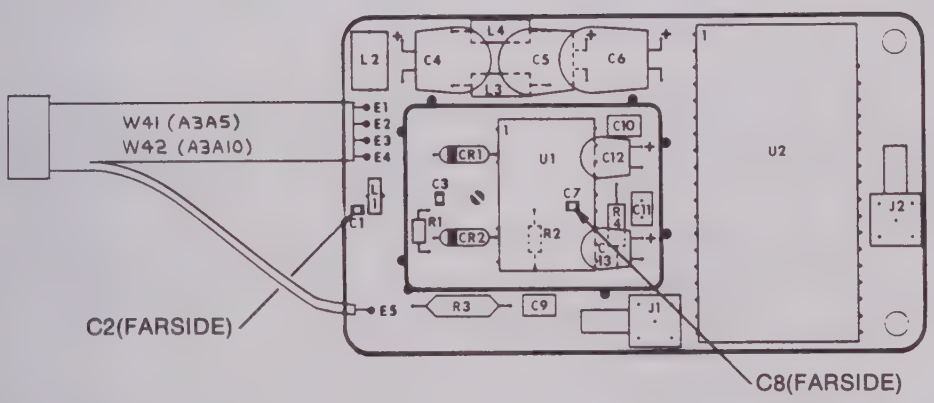
Figure 6-11. A3A4 N/1 Divider PCB Assembly

Table 6-12. A3A5 VCO Resonator PCB Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
A3A5	VCO RESONATOR PCB ASSEMBLY FIGURE 6-12 (6070A-4012T) (MATCHED TO A3A10 PCB)	463364	89536	463364	REF		1
C1	CAP, CHIP, 1000 PF +/-5%, 50V	484378	89536	484378	2		
C2	CAP, CHIP, 1000 PF +/-5%, 50V	484378	89536	484378	REF		
C3	CAP, CHIP, 22 PF +/-5%, 50V	484360	89536	484360	1		
C4	CAP, TA, 68 UF +/-20%, 15V	193615	56289	196D686X0015LA3	1		
C5	CAP, TA, 82 UF +/-20%, 20V	357392	12954	D82GS2D20M	2		
C6	CAP, TA, 82 UF +/-20%, 20V	357392	12954	D82GS2D20M	REF		
C7	CAP, CHIP, 330 PF +/-5%, 50V	512038	89536	512038	2		
C8	CAP, CHIP, 330 PF +/-5%, 50V	512038	89536	512038	REF		
C9	CAP, CER. 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	3		
C10	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C11	CAP, CER. 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C12	CAP, TA, 22 UF +/-20%, 15V	423012	56289	196D226X0015KA1	2		
C13	CAP, TA, 22 UF +/-20%, 15V	423012	56289	196D226X0015KA1	REF		
CR1	DIODE, VARACTOR TUNING (SET OF 4)	534875	91462	DKV6534CM4	1	1	2
CR2	PART OF CR1						2
J1	CONN, COAX, SNAP-ON RECPT. PCB MOUNT	353243	98291	51-053-0000	2		
J2	CONN, COAX, SNAP-ON RECPT. PCB MOUNT	353243	98291	51-053-0000	REF		
L1	INDUCTOR, 10T	463448	89536	463448	1		
L2	CHOKE, 6-TURN	320911	89536	320911	1		
L3	CHOKE, RF, 180 UH +/-5%, 300 MA	174771	72259	WEE-180	2		
L4	CHOKE, RF, 180 UH +/-5%, 300 MA	174771	72259	WEE-180	REF		
R1	RES, COMP, 22 +/-5%, 1/8W	474767	01121	BB1-82205	2		
R2	RES, COMP, 22 +/-5%, 1/8W	474767	01121	BB1-82205	REF		
R3	RES, MTL. FILM, 84.5 +/-1%, 1/8W	236851	91637	CMF558452F	1		
R4	RES, DEP. CAR, 560 +/-5%, 1/4W	385948	80031	CR251-4-5P560E	1		
U1	VCO, HYBRID ASSEMBLY	492793	89536	492793	1	1	
U2	VCO BUFFER, HYBRID ASSEMBLY	492736	89536	492736	1	1	
W41	CABLE ASSEMBLY	508986	89536	508986	1		

1 BEFORE ORDERING SPARE PARTS OR SPARE PCB ASSEMBLIES, PLEASE CONTACT YOUR NEAREST JOHN FLUKE SERVICE CENTER FOR INFORMATION

2 MATCHED TO CR1/CR2 LOCATED ON ASSEMBLY A3A10



6070A-1612

Figure 6-12. A3A5 VCO Resonator PCB Assembly

Table 6-13. A3A6 Single Sideband Mixer PCB Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
A3A6	SINGLE SIDEBAND MIXER PCB ASSEMBLY FIGURE 6-13 (6070A-4007T)	463513	89536	463513	REF		
C1	CAP, TA, 22 UF +/-20%, 35V	394775	56289	196D226X0035TE4	1		
C2	CAP, TA, 22 UF +/-20%, 15V	423012	56289	196D226X0015KA1	3		
C3	CAP, TA, 22 UF +/-20%, 15V	423012	56289	196D226X0015KA1	REF		
C4	CAP, TA, 22 UF +/-20%, 15V	423012	56289	196D226X0015KA1	REF		
C5	CAP, CER, 0.005 UF +/-20%, 50V	255471	51642	200-050-601-502M	16		
C6	CAP, CER, 0.005 UF +/-20%, 50V	255471	51642	200-050-601-502M	REF		
C7	CAP, CER, 0.005 UF +/-20%, 50V	255471	51642	200-050-601-502M	REF		
C8	CAP, CER, 0.005 UF +/-20%, 50V	255471	51642	200-050-601-502M	REF		
C9	CAP, CER, 0.005 UF +/-20%, 50V	255471	51642	200-050-601-502M	REF		
C10	CAP, TA, 2.2 UF +/-20%, 20V	161927	56289	196D2225X0020HA1	6		
C11	CAP, CER, 0.005 UF +/-20%, 50V	255471	51642	200-050-601-502M	REF		
C12	CAP, CER, 0.005 UF +/-20%, 50V	255471	51642	200-050-601-502M	REF		
C14	CAP, CER, 0.005 UF +/-20%, 50V	255471	51642	200-050-601-502M	REF		
C15	CAP, CER, 0.005 UF +/-20%, 50V	255471	51642	200-050-601-502M	REF		
C16	CAP, CER, 0.005 UF +/-20%, 50V	255471	51642	200-050-601-502M	REF		
C17	CAP, TA, 2.2 UF +/-20%, 20V	161927	56289	196D2225X0020HA1	REF		
C18	CAP, CERM, 0.22 UF +/-20%, 50V	309849	72982	8131-050-651-022	4		
C19	CAP, CERM, 0.22 UF +/-20%, 50V	309849	72982	8131-050-651-022	REF		
C20	CAP, CER, 0.005 UF +/-20%, 50V	255471	51642	200-050-601-502M	REF		
C21	CAP, TA, 2.2 UF +/-20%, 20V	161927	56289	196D2225X0020HA1	REF		
C22	CAP, TA, 2.2 UF +/-20%, 20V	161927	56289	196D2225X0020HA1	REF		
C23	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	1		
C24	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	3		
C25	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C26	CAP, TA, 10 UF +/-20%, 35V	417683	56289	196D106X0035PE4	1		
C27	CAP, MYLAR, .047 UF +/-10%, 250V	162008	73445	C280MAE/A47K	1		
C28	CAP, CER, 100 PF +/-2%, 100V	512848	89536	512848	1		
C30	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C31	CAP, CER, 360 PF +/-5%, 50V	528471	89536	528471	1		
C32	CAP, CER, 620 PF +/-5%, 50V	528513	89536	528513	2		
C33	CAP, CER, 150 PF +/-5%, 100V	512988	89536	512988	1		
C34	CAP, CER, 1800 PF +/-5%, 50V	528547	89535	528547	1		
C35	CAP, CER, 68 PF +/-2%, 100V	362756	89536	362756	1		
C36	CAP, CER, 620 PF +/-5%, 50V	528513	89536	528513	REF		
C37	CAP, CER, 0.005 UF +/-20%, 50V	255471	51642	200-050-601-502M	REF		
C38	CAP, CER, 0.005 UF +/-20%, 50V	255471	51642	200-050-601-502M	REF		
C39	CAP, TA, 0.47 UF +/-20%, 35V	161349	56289	196D474X0035HA1	1		
C40	CAP, TA, 2.2 UF +/-20%, 20V	161927	56289	196D2225X0020HA1	REF		
C41	CAP, CERM, 0.22 UF +/-20%, 50V	309849	72982	8131-050-651-022	REF		
C42	CAP, CER, 1000 PF +/-5%, 50V	528539	89536	528539	2		
C43	CAP, CER, 3300 PF +/-5%, 50V	528554	89536	528554	2		
C44	CAP, CER, 5600 PF +/-5%, 50V	528596	89536	528596	2		
C45	CAP, CERM, 0.22 UF +/-20%, 50V	309849	72982	8131-050-651-022	REF		
C46	CAP, CER, 1000 PF +/-5%, 50V	528539	89536	528539	REF		
C47	CAP, CER, 3300 PF +/-5%, 50V	528554	89536	528554	REF		
C48	CAP, CER, 5600 PF +/-5%, 50V	528596	89536	528596	REF		
C49	CAP, TA, 2.2 UF +/-20%, 20V	161927	56289	196D2225X0020HA1	REF		

Table 6-13. A3A6 Single Sideband Mixer PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
C50	CAP, CER. 0.005 UF +/-20%, 50V	255471	51642	200-050-601-502M	REF		
C51	CAP, CER. 0.005 UF +/-20%, 50V	255471	51642	200-050-601-502M	REF		
C52	CAP, CER. 0.005 UF +/-20%, 50V	255471	51642	200-050-601-502M	REF		
CR1	DIODE, SI, SWITCHING	313247	28480	HP5082-6264	4	1	
CR2	DIODE, SI, SWITCHING	313247	28480	HP5082-6264	REF		
CR3	DIODE, SI, SWITCHING	313247	28480	HP5082-6264	REF		
CR4	DIODE, SI, SWITCHING	313247	28480	HP5082-6264	REF		
CR5	DIODE, SI, HI-SPEED SWITCHING	203323	07910	1N4448	3	1	
CR8	DIODE, 2 PELLET	375477	09214	MPD200	4	1	
CR9	DIODE, 2 PELLET	375477	09214	MPD200	REF		
CR10	DIODE, 2 PELLET	375477	09214	MPD200	REF		
CR11	DIODE, 2 PELLET	375477	09214	MPD200	REF		
CR12	DIODE, SI, HI-SPEED SWITCHING	203323	07910	1N4448	REF		
CR13	DIODE, SI, HI-SPEED SWITCHING	203323	07910	1N4448	REF		
J1	CONNECTOR, RF, SMB	512095	16733	702033	2		
J2	CONNECTOR, RF, SMB	512095	16733	702033	REF		
J3	CONNECTOR, POST	267500	00799	86144-2	5		
L1	CHOKE, 6-TURN	320911	89536	320911	13		
L2	CHOKE, 6-TURN	320911	89536	320911	REF		
L3	CHOKE, 6-TURN	320911	89536	320911	REF		
L4	CHOKE, 6-TURN	320911	89536	320911	REF		
L5	CHOKE, 6-TURN	320911	89536	320911	REF		
L6	INDUCTOR, 1000 UH +/-5%	461541	24759	MP-1000	1		
L7	INDUCTOR, 1800 UH +/-10%	461517	24759	MR-1800	1		
L8	INDUCTOR, 330 UH +/-10%	479303	24759	MR-330	1		
L9	CHOKE, 6-TURN	320911	89536	320911	REF		
L10	INDUCTOR, 56 UH +/-5%	461525	24759	MP-56	2		
L11	CHOKE, 6-TURN	320911	89536	320911	REF		
L12	CHOKE, 6-TURN	320911	89536	320911	REF		
L13	INDUCTOR, 56 UH +/-5%	461525	24759	MP-56	REF		
L14	CHOKE, 6-TURN	320911	89536	320911	REF		
L15	CHOKE, 6-TURN	320911	89536	320911	REF		
L16	CHOKE, 6-TURN	320911	89536	320911	REF		
L17	CHOKE, 6-TURN	320911	89536	320911	REF		
L18	CHOKE CORE	321182	89536	321182	4		
L19	CHOKE, 6-TURN	320911	89536	320911	REF		
L20	CHOKE CORE	321182	89536	321182	REF		
L21	CHOKE CORE	321182	89536	321182	REF		
L22	CHOKE CORE	321182	89536	321182	REF		
MP1	AIDE, PCB PULL (NOT SHOWN)	541730	89536	541730	2		
MP2	FENCE, SSB MIXER (NOT SHOWN)	541664	89536	541664	1		
MP3	SHIELD, SSB MIXER (NOT SHOWN)	515965	89536	515965	1		
P1	COMPONENT LEAD, SPRING TYPE	544056	89536	544056	5		
Q1	TRANSISTOR, SI, PNP	402586	04713	2N905A	1		
Q2	TRANSISTOR, SI, PNP	229898	04713	MPS6522	1		
R1	RES, COMP, 220 +/-10%, 1/8W	153957	01121	BB1-822010	2		
R2	RES, COMP, 220 +/-10%, 1/8W	153957	01121	BB1-822010	REF		
R3	RES, DEP. CAR. 27K +/-5%, 1/4W	441501	89536	441501	2		
R4	RES, COMP, 510 +/-5%, 1/4W	441600	01121	005115	4		
R5	RES, COMP, 510 +/-5%, 1/4W	441600	01121	005115	REF		

Table 6-13. A3A6 Single Sideband Mixer PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
R6	RES, DEP. CAR. 560 +/-5%, 1/4W	385948	80031	CR251-4-5P560E	8		
R7	RES. DEP. CAR. 47 +/-5%, 1/4W	441592	80031	CR251-4-5P47E	3		
R8	RES, DEP. CAR. 47 +/-5%, 1/4W	441592	80031	CR251-4-5P47E	REF		
R9	RES, COMP, 150 +/-5%, 1/2W	186056	89536	186056	2		
R10	RES, COMP, 150 +/-5%, 1/2W	186056	89536	186056	REF		
R11	RES, MTL. FILM, 10K +/-1%, 1/8W	168260	91637	CMF55103	1		
R12	RES, MTL. FILM, 2K, +/-1%, 1/8W	235226	91637	CMF552001F	1		
R13	RES, DEP. CAR. 560 +/-5%, 1/4W	385948	80031	CR251-4-5P560E	REF		
R14	RES, DEP. CAR, 560 +/-5%, 1/4W	385948	80031	CR251-4-5P560E	REF		
R15	RES, DEP. CAR. 560 +/-5%, 1/4W	385948	80031	CR251-4-5P560E	REF		
R16	RES, COMP, 510 +/-5%, 1/4W	441600	01121	005115	REF		
R17	RES, COMP, 510 +/-5%, 1/4W	441600	01121	005115	REF		
R18	RES, DEP. CAR. 27K +/-5%, 1/4W	441501	89536	441501	REF		
R19	RES, DEP. CAR. 560 +/-5%, 1/4W	385948	80031	CR251-4-5P560E	REF		
R20	RES, COMP, 22 +/-5%, 1/8W	474767	01121	BB1-82205	4		
R21	RES, DEP. CAR. 560 +/-5%, 1/4W	385948	80031	CR251-4-5P560E	REF		
R22	RES, COMP, 22 +/-5%, 1/8W	474767	01121	BB1-82205	REF		
R23	RES, DEP. CAR. 470 +/-5%, 1/4W	343434	89536	343434	3		
R24	RES, DEP. CAR. 470 +/-5%, 1/4W	343434	89536	343434	REF		
R25	RES, DEP. CAR. 6.8K +/-5%, 1/4W	368761	80031	CR251-4-5P6K8	1		
R26	RES, MTL. FILM, 4.02K +/-1%, 1/8W	235325	91637	CMF554021F	1		
R27	RES, MTL. FILM, 1K +/-1%, 1/8W	168229	91637	CMF551001F	4		
R28	RES, MTL. FILM, 3.65K +/-1%, 1/8W	168252	91637	CMF553651F	2		
R29	RES, MTL. FILM, 825 +/-1%, 1/8W	294892	91637	CMF55 CHECK REST	1		
R30	RES, VAR, 1K +/-10%, 1/2W	275750	11236	360T102A	1		
R31	RES, DEP. CAR. 47 +/-5%, 1/4W	441592	80031	CR251-4-5P47E	REF		
R32	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	2		
R33	RES, MTL. FILM, 1.27K +/-1%, 1/8W	267369	91637	CMF551271F	1		
R34	RES, MTL. FILM, 2.67K +/-1%, 1/8W	289587	91637	CMF552671F	1		
R35	RES, MTL. FILM, 3.74K +/-1%, 1/8W	272096	91637	CMF553743F	1		
R36	RES, DEP. CAR, 100 +/-5%, 1/4W	348771	80031	CR251-4-5P100E	3		
R37	RES, MTL. FILM, 5.76K +/-1%, 1/8W	260349	91637	CMF555761F	1		
R38	RES, DEP. CAR, 100 +/-5%, 1/4W	348771	80031	CR251-4-5P100E	REF		
R39	RES, MTL. FILM, 1K +/-1%, 1/8W	168229	91637	CMF551001F	REF		
R40	RES, DEP. CAR. 560 +/-5%, 1/4W	385948	80031	CR251-4-5P560E	REF		
R41	RES, DEP. CAR, 560 +/-5%, 1/4W	385948	80031	CR251-4-5P560E	REF		
R42	RES, COMP, 22 +/-5%, 1/8W	474767	01121	BB1-82205	REF		
R43	RES, COMP, 22 +/-5%, 1/8W	474767	01121	BB1-82205	REF		
R45	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R46	RES, MTL. FILM, 49.9 +/-1%, 1/8W	305896	91637	CMF5549R9F	3		
R47	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	89536	348839	1		
R48	RES, MTL. FILM, 4.53K +/-1%, 1/8W	260331	91637	CMF554531F	1		
R49	RES, MTL. FILM, 10.5K +/-1%, 1/8W	234096	91637	CMF551052F	1		
R50	RES, MTL. FILM, 1.5K +/-1%, 1/8W	313098	91637	CMF55152F	1		
R51	RES, VAR, 2K	309666	89536	309666	1		
R52	RES, VAR, 5K +/-10%, 1/2W	327569	11236	360T502A	1		
R53	RES, DEP. CAR, 470 +/-5%, 1/4W	343434	89536	343434	REF		
R54	RES, DEP. CAR. 56 +/-5%, 1/4W	342618	80031	CR251-4-5P56E	1		
R55	RES, DEP. CAR, 100 +/-5%, 1/4W	348771	80031	CR251-4-5P100E	REF		
R56	RES, MTL. FILM, 3.65K +/-1%, 1/8W	168252	91637	CMF553651F	REF		

Table 6-13. A3A6 Single Sideband Mixer PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
R57	RES, MTL. FILM, 1K +/-1%, 1/8W	168229	91637	CMF551001F	REF		
R58	RES, MTL. FILM, 1K +/-1%, 1/8W	168229	91637	CMF551001F	REF		
R59	RES, DEP. CAR. 51 +/-5%, 1/4W	414540	80031	CR251-4-5P51E	1		
R60	RES, MTL. FILM, 100 +/-1%, 1/8W	168195	91637	CMF551000F	2		
R61	RES, MTL. FILM, 562 +/-1%, 1/8W	340828	91637	CMF555620F	2		
R62	RES, MTL. FILM, 68.1 +/-1%, 1/8W	305995	91637	CMF5568R1F	2		
R63	RES, MTL. FILM, 49.9 +/-1%, 1/8W	305896	91637	CMF5549R9F	REF		
R64	RES, MTL. FILM, 100 +/-1%, 1/8W	168195	91637	CMF551000F	REF		
R65	RES, MTL. FILM, 562 +/-1%, 1/8W	340828	91637	CMF555620F	REF		
R66	RES, MTL. FILM, 68.1 +/-1%, 1/8W	305995	91637	CMF5568R1F	REF		
R67	RES, MTL. FILM, 49.9 +/-1%, 1/8W	305896	91637	CMF5549R9F	REF		
R68	RES, MTL. FILM, 15.0 +/-1%, 1/8W	296434	91637	CMF5515R0F	2		
R69	RES, MTL. FILM, 15.0 +/-1%, 1/8W	296434	91637	CMF5515R0F	REF		
R70	RES, COMP, 68 +/-10%, 1/8W	261818	01121	BB6801	1		
R71	RES, COMP, 100 +/-10%, 1/8W	261826	01121	BB1011	2		
R72	RES, COMP, 100 +/-10%, 1/8W	261826	01121	BB1011	REF		
TP1-6	CONNECTOR (FASTON TAP)	512889	02660	62395-1834	6		
U1	IC, ECL 1600 SER DIV-BY-4 GHZ PRSCALER	472787	04713	MC1697P	2	1	
U2	IC, ECL, DUAL TYPE "D" M-S, F/F	525345	04713	MC10231L	2	1	
U3	IC, DUAL TYPE "D" MASTER SLAVE FLIP FLOP	535492	04713	MC10131L	2	1	
U4	IC, ECL, DUAL TYPE "D" M-S, F/F	525345	04713	MC10231L	REF		
U5	IC, ECL 1600 SER DIV-BY-4 GHZ PRSCALER	472787	04713	MC1697P	REF		
U6	IC, HYBRID, 15DB AMP	492785	89536	492785	1	1	
U7	IC, HYBRID, 6DB AMP	492819	89536	492819	1	1	
U8	IC, LINEAR, OP-AMP	413740	12040	LM307N	1	1	
U9	IC, LINEAR, OP-AMP	472779	12040	LF386N	1	1	
U10	IC, ECL, PHASE FREQUENCY DETECTOR	525311	04713	MC12040L	1	1	
U11	IC, L.O. - RF ISOLATION >30DB	525493	89536	525493	2	1	
U12	IC, L.O. - RF ISOLATION >30DB	525493	89536	525493	REF		
U13	IC, HYBRID, 8DB AMP	492801	89536	492801	1	1	
U14	XSTR, LIN, ARRAY, 2-PNP, 16-PIN DIP	418954	02735	CA3096E	1	1	
U15	IC, LINEAR, OP-AMP	418566	12040	LM358N	1	1	
U16	IC, TTL DUAL D-TYPE FLIP-FLOP	393124	01295	SN74LS74N	1	1	
U17	IC, DUAL TYPE "D" MASTER SLAVE FLIP FLOP	535492	04713	MC10131L	REF		
W1	CABLE ASSEMBLY, RF	530774	89536	530774			
W39	CABLE ASSEMBLY, SSB/VCO	537779	89536	537779	1		
XQ1	TRANSISTOR PAD, SPACER (NOT SHOWN)	152207	07047	10123-DAP	1		
XU1	SOCKET, COMPONENT LEAD (NOT SHOWN)	376418	22526	75060-007	81		
XU2	SOCKET, IC, 16-PIN DIP	370312	91506	316-AG39D	5		
XU3	SOCKET, IC, 16-PIN DIP	370312	91506	316-AG39D	REF		
XU4	SOCKET, IC, 16-PIN DIP	370312	91506	316-AG39D	REF		
XU5	SOCKET, COMPONENT LEAD (NOT SHOWN)	376418	22526	75060-007	REF		
XU6	SOCKET, COMPONENT LEAD (NOT SHOWN)	376418	22526	75060-007	REF		
XU7	SOCKET, COMPONENT LEAD (NOT SHOWN)	376418	22526	75060-007	REF		
XU8	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	3		
XU9	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	REF		
XU10	SOCKET, 14-PIN	370304	12040	MM74C906N	2		
XU11	SOCKET, COMPONENT LEAD (NOT SHOWN)	376418	22526	75060-007	REF		
XU12	SOCKET, COMPONENT LEAD (NOT SHOWN)	376418	22526	75060-007	REF		
XU13	SOCKET, COMPONENT LEAD (NOT SHOWN)	376418	22526	75060-007	REF		

Table 6-13. A3A6 Single Sideband Mixer PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
XU14	SOCKET, IC, 16-PIN DIP	370312	91506	316-AG39D	REF		
XU15	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	REF		
XU16	SOCKET, 14-PIN	370304	12040	MM74C906N	REF		
XU17	SOCKET, IC, 16-PIN DIP	370312	91506	316-AG39D	REF		

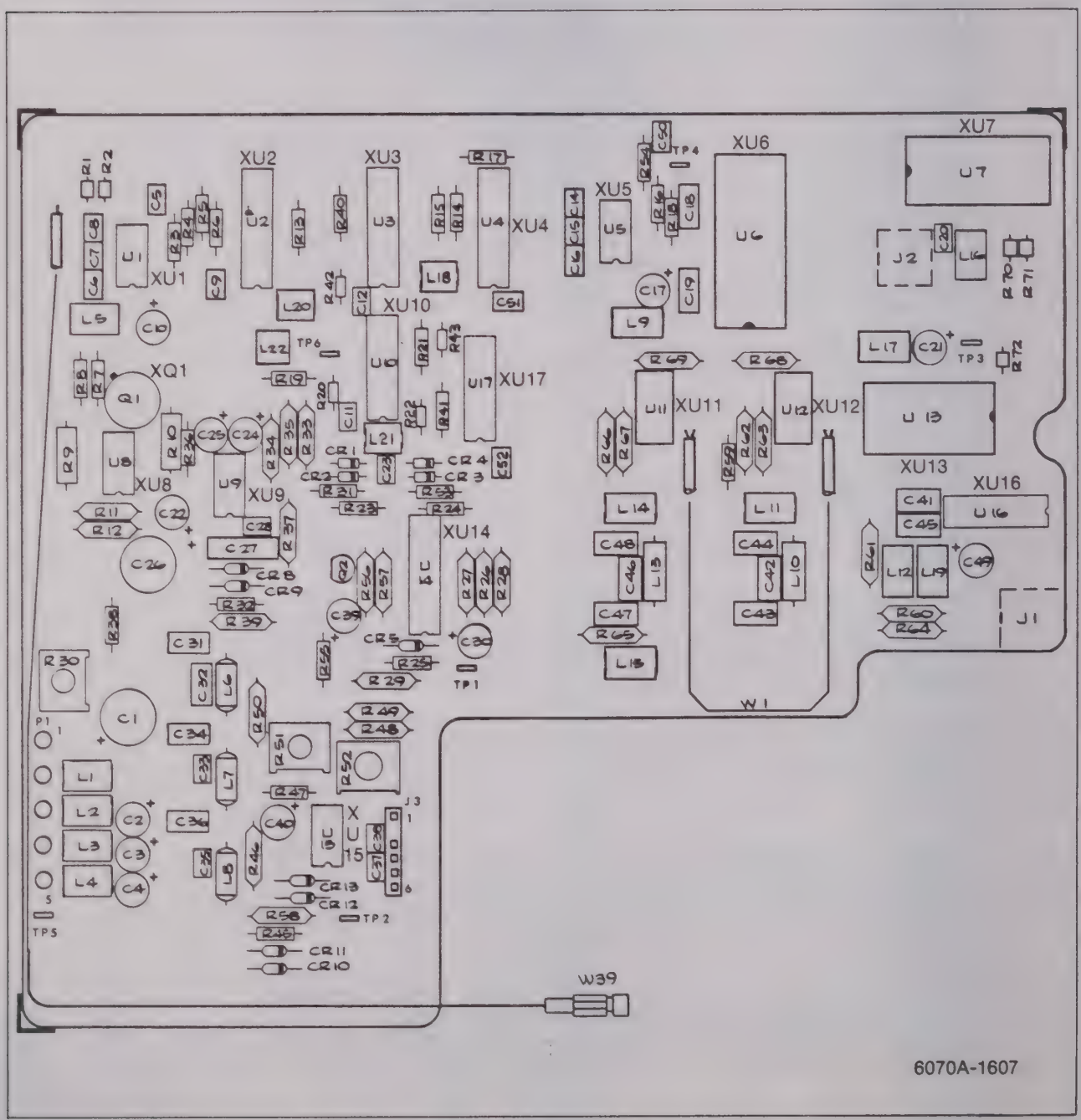


Figure 6-13. A3A6 Single Sideband Mixer PCB Assembly

Table 6-14. A3A7 Sub Synthesizer PCB Mixer

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
A3A7⊘	SUB SYNTHESIZER PCB ASSEMBLY FIGURE 6-14 (6070A-4011T)	463554	89536	463554	REF		
C1	CAP, TA, 68 UF +/-20%, 15V	193615	56289	196D686X0015LA3	1		
C2	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	21		
C3	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C4	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C5	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C6	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C7	CAP, CER, 0.22 UF +/-20%, 50V	309849	72982	8131-050-651-022	7		
C8	CAP, CER, 430 PF +/-5%, 50V	528489	89536	528489	2		
C9	CAP, PLASTIC, 0.47 UF +/-10%, 50V	271858	06001	75F1R5A474	2		
C10	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C11	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C12	CAP, CER, 430 PF +/-5%, 50V	528489	89536	528489	REF		
C13	CAP, POLY, 510 PF +/-5%, 630V	528455	12954	B31063/510/1/630	1		
C14	CAP, POLY, 1200 PF +/-5%, 63V	513713	12954	B31063/1200/5/63	1		
C16	CAP, PLASTIC, 0.47 UF +/-10%, 50V	271858	06001	75F1R5A474	REF		
C17	CAP, POLY, 1300 PF +/-5%, 63V	513127	12954	B31063/1300/5/63	1		
C18	CAP, POLY, 7500 PF +/-5%, 63V	528430	12954	B31063/7500/5/63	1		
C19	CAP, POLY, 8200 PF +/-5%, 63V	513739	12954	B31063/8200/5/63	1		
C20	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	9		
C21	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	1		
C22	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C23	CAP, POLY, 100 PF +/-1%, 63V	528372	12954	B31063/100/1/63	1		
C24	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C25	CAP, POLY, 470 PF +/-1%, 63V	528356	12954	B31063/470/1/63	1		
C26	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C27	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C28	CAP, CER, 0.22 UF +/-20%, 50V	309849	72982	8131-050-651-022	REF		
C29	CAP, CER, 0.22 UF +/-20%, 50V	309849	72982	8131-050-651-022	REF		
C30	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C31	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C32	CAP, CER, 0.22 UF +/-20%, 50V	309849	72982	8131-050-651-022	REF		
C33	CAP, MYLAR, 0.0033 UF +/-10%, 50V	402867	80031	75F1R5A332	1		
C34	CAP, MYLAR, 0.01 UF +/-10%, 50V	309906	80031	75F1R5A100	2		
C35	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C36	CAP, MYLAR, 0.015 UF +/-10%, 50V	402891	80031	75F1R5A153	1		
C37	CAP, FILM, 0.22 UF +/-10%, 50V	271577	06001	751R5A223	1		
C38	CAP, MYLAR, 0.01 UF +/-10%, 50V	309906	80031	75F1R5A100	REF		
C39	CAP, POLY, 330 PF +/-1%, 63V	528364	12954	B31063/330/1/63	1		
C40	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C41	CAP, POLY, 1000 PF +/-1%, 63V	528380	12954	B31063/1000/1/63	1		
C42	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C43	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C45	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C46	CAP, CER, 100 PF +/-2%, 100V	512848	89536	512848	1		
C47	CAP, CER, 22 PF +/-2%, 100V	512871	89536	512871	1		
C48	CAP, CER, 82 PF +/-2%, 100V	512350	89536	512350	1		
C49	CAP, CER, 39 PF +/-2%, 100V	512962	89536	512962	1		

Table 6-14. A3A7 Sub Synthesizer PCB Mixer (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
C50	CAP, CER, 150 PF +/-5%, 100V	512988	89536	512988	1		
C51	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C52	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C53	CAP, CER, 0.22 UF +/-20%, 50V	309849	72982	8131-050-651-022	REF		
C54	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C55	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C56	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C57	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C58	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C59	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C60	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C61	CAP, CER, 0.22 UF +/-20%, 50V	309849	72982	8131-050-651-022	REF		
C62	CAP, TA, 47 UF +/-20%, 20V	348516	56289	A96D476X0020KE4	2		
C63	CAP, TA, 47 UF +/-20%, 20V	348516	56289	A96D476X0020KE4	REF		
C64	CAP, CER, 0.22 UF +/-20%, 50V	309849	72982	8131-050-651-022	REF		
C65	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C66	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C67	CAP, TA, 22 UF +/-20%, 15V	423012	56289	196D225X0015KA1	1		
CR1	DIODE, VARACTOR TUNING (SINGLE)	508069	91462	DKV6534C	1	1	
CR2	DIODE, SI, SWITCHING	313247	28480	HP5082-6264	1	1	
J1	CONNECTOR, RF, SMB	512095	16733	702033	2		
J2	CONNECTOR, RF, SMB	512095	16733	702033	REF		
L1	CHOKE, 6-TURN	320911	89536	320911	6		
L2	CHOKE, 6-TURN	320911	89536	320911	REF		
L3	CHOKE, 1200 MH +/-10%, 125MA	343855	24759	MR-1200	1		
L4	CHOKE, 2200 UH 99MA	147801	72259	WEE-2200	1		
L5	INDUCTOR, VARIABLE	513812	07557	530-1535-04-01	1		
L6	CHOKE, 6-TURN	320911	89536	320911	REF		
L7	CHOKE, 6-TURN	320911	89536	320911	REF		
L8	CHOKE, 39 UH +/-10%, 429MA	344010	24759	MR-39	1		
L9	CHOKE, 27 UH +/-10%, 526MA	513853	24759	MR-27	1		
L10	INDUCTOR, 0.39 UH +/-10%, 1060 MA	257162	24759	MR0.39	1		
L11	INDUCTOR, 0.18 UH +/-10%, 2300 MA	249060	24759	MR0.18	1		
L12	CHOKE, 6-TURN	320911	89536	320911	REF		
L13	CHOKE, 6-TURN	320911	89536	320911	REF		
L14	INDUCTOR, 100 UH, +/-10%, 120 MA	249102	24759	MR-100	1		
MP1	AIDE, PCB PULL	541730	89536	541730	3		
MP2	BRACKET, INDICATOR MOUNTING	537530	89536	537530	1		
P1	COMPONENT LEAD, SPRING TYPE	544056	89536	544056	15		
Q1	TRANSISTOR, PNP, HI-SPEED SWITCHING	369629	07263	543576	4	1	
Q2	TRANSISTOR, PNP, HI-SPEED SWITCHING	369629	07263	543576	REF		
Q3	TRANSISTOR, PNP, HI-SPEED SWITCHING	369629	07263	543576	REF		
Q4	TRANSISTOR, PNP, HI-SPEED SWITCHING	369629	07263	543576	REF		
Q5	TRANSISTOR, SI, NPN	248351	04713	MPS918	1	1	
Q6Ⓧ	TRANSISTOR, D-MOS	507905	18324	SD305	1	1	
R1	RES, DEP. CAR. 10K +/-5%, 1/4W	348839	89536	348839	4		
R2	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	89536	348839	REF		
R3	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	89536	348839	REF		
R4	RES, DEP. CAR, 1.8K +/-5%, 1/4W	441444	80031	CR251-4-5P1K8	2		
R5	RES, VAR, 5K +/-10%, 1/2W	327569	11236	360T502A	1		

Table 6-14. A3A7 Sub Synthesizer PCB Mixer (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
R6	RES, DEP. CAR, 1.8K +/-5%, 1/4W	441444	80031	CR251-4-5P1K8	REF		
R7	RES, DEP. CAR, 510 +/-5%, 1/4W	441600	80031	CR251-4-5P510E	6		
R8	RES, DEP. CAR, 120K +/-5%, 1/4W	441386	80031	CR251-4-5P120K	1		
R9	RES, DEP. CAR, 2.2K +/-5%, 1/4W	343400	80031	CR251-4-5P2K2	2		
R10	RES, DEP. CAR, 510 +/-5%, 1/4W	441600	80031	CR251-4-5P510E	REF		
R11	RES, DEP. CAR, 510 +/-5%, 1/4W	441600	80031	CR251-4-5P510E	REF		
R12	RES, DEP. CAR, 220 +/-5%, 1/4W	342626	80031	CR251-4-5P220E	3		
R13	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	4		
R14	RES, DEP. CAR, 7.5K +/-5%, 1/4W	441667	80031	CR251-4-5P7K5	4		
R15	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R16	RES, DEP. CAR, 7.5K +/-5%, 1/4W	441667	80031	CR251-4-5P7K5	REF		
R17	RES, DEP. CAR, 2.2K +/-5%, 1/4W	343400	80031	CR251-4-5P2K2	REF		
R18	RES, DEP. CAR, 150 +/-5%, 1/4W	343442	80031	CR251-4-5P150E	4		
R19	RES, DEP. CAR, 150 +/-5%, 1/4W	343442	80031	CR251-4-5P150E	REF		
R20	RES, DEP. CAR, 51 +/-5%, 1/4W	414540	80031	CR251-4-5P51E	4		
R21	RES, MTL. FILM, 3.65K +/-1%, 1/8W	293779	91637	CMF553651F	1		
R22	RES, MTL. FILM, 2.15K +/-1%, 1/8W	293712	91637	CMF552151F	1		
R23	RES, DEP. CAR, 300 +/-5%, 1/4W	441519	80031	CR251-4-5P300E	1		
R24	RES, DEP. CAR, 56 +/-5%, 1/4W	342618	80031	CR251-4-5P56E	1		
R25	RES, DEP. CAR, 16 +/-5%, 1/4W	442194	80031	CR251-4-5P16E	3		
R26	RES, DEP. CAR, 16 +/-5%, 1/4W	442194	80031	CR251-4-5P16E	REF		
R27	RES, DEP. CAR, 100 +/-5%, 1/4W	348771	80031	CR251-4-5P100E	5		
R28	RES, DEP. CAR, 16 +/-5%, 1/4W	442194	80031	CR251-4-5P16E	REF		
R29	RES, DEP. CAR, 51 +/-5%, 1/4W	414540	80031	CR251-4-5P51E	REF		
R30	RES, DEP. CAR, 150 +/-5%, 1/4W	343442	80031	CR251-4-5P150E	REF		
R31	RES, DEP. CAR, 150 +/-5%, 1/4W	343442	80031	CR251-4-5P150E	REF		
R32	RES, MTL. FILM, 5.76K +/-1%, 1/8W	260349	91637	CMF555761F	1		
R33	RES, MTL. FILM, 2.26K +/-1%, 1/8W	328294	91637	CMF552261F	1		
R34	RES, DEP. CAR, 510 +/-5%, 1/4W	441600	80031	CR251-4-5P510E	REF		
R35	RES, DEP. CAR, 10 +/-5%, 1/4W	340075	80031	CR251-4-5P10E	1		
R36	RES, DEP. CAR, 100 +/-5%, 1/4W	348771	80031	CR251-4-5P100E	REF		
R37	RES, DEP. CAR, 220 +/-5%, 1/4W	342626	80031	CR251-4-5P220E	REF		
R38	RES, DEP. CAR, 51 +/-5%, 1/4W	414540	80031	CR251-4-5P51E	REF		
R39	RES, DEP. CAR, 51 +/-5%, 1/4W	414540	80031	CR251-4-5P51E	REF		
R40	RES, DEP. CAR, 18 +/-5%, 1/4W	441428	80031	CR251-4-5P18E	4		
R41	RES, DEP. CAR, 18 +/-5%, 1/4W	441428	80031	CR251-4-5P18E	REF		
R42	RES, DEP. CAR, 18 +/-5%, 1/4W	441428	80031	CR251-4-5P18E	REF		
R43	RES, DEP. CAR, 18 +/-5%, 1/4W	441428	80031	CR251-4-5P18E	REF		
R44	RES, DEP. CAR, 510 +/-5%, 1/4W	441600	80031	CR251-4-5P510E	REF		
R45	RES, DEP. CAR, 510 +/-5%, 1/4W	441600	80031	CR251-4-5P510E	REF		
R46	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R47	RES, DEP. CAR, 7.5K +/-5%, 1/4W	441667	80031	CR251-4-5P7K5	REF		
R48	RES, DEP. CAR, 7.5K +/-5%, 1/4W	441667	80031	CR251-4-5P7K5	REF		
R49	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R50	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	89536	348839	REF		
R51	RES, DEP. CAR, 100 +/-5%, 1/4W	348771	80031	CR251-4-5P100E	REF		
R52	RES, DEP. CAR, 470 +/-5%, 1/4W	343434	89536	343434	1		
R53	RES, DEP. CAR, 100 +/-5%, 1/4W	348771	80031	CR251-4-5P100E	REF		
R54	RES, DEP. CAR, 220 +/-5%, 1/4W	342626	80031	CR251-4-5P220E	REF		
R55	RES, DEP. CAR, 100 +/-5%, 1/4W	348771	80031	CR251-4-5P100E	REF		

Table 6-14. A3A7 Sub Synthesizer PCB Mixer (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
R56	RES, DEP. CAR. 33 +/-5%, 1/4W	414524	80031	CR251-4-5P33E	1		
SW1	SWITCH, SLIDE, DPDT	393629	10389	23-021-114	1		
TP1-16	CONNECTOR, TEST POINT	512889	02660	62395-1834	16		
U1	IC, TTL, DUAL D-TYPE FLIP FLOP	393124	01295	SN74LS74N	1	1	
U2	IC, TTL, QUAD, 2-INPUT NAND GATES	293068	01295	SN74H00P	1	1	
U3	IC, TTL, DUAL J-K EDGE TRIG, F/F	363440	01295	SN74S117N	2	1	
U4	IC, TTL, J-K F/F, AND INPUTS	292092	01295	SN74H102N	1	1	
U5	IC, TTL, 50 MHZ, PRESET, DECODED BINARY	320770	01295	SN74197N	1	1	
U6	IC, TTL LO-PWR SCHTKY OCTAL "D: TYPE F/F	454892	01295	SN74LS273N	3	1	
U7	IC, 8-BIT ADDRESSABLE LATCH	419242	01295	SN74LS259N	3	1	
U8	IC, TTL, DUAL J-K EDGE TRIG, F/F	363440	01295	SN74S117N	REF		
U9Ø	IC, TTL, SYNCH DECADE RATE MULTIPLIER	454884	01295	SN74167N	4	1	
U10Ø	IC, TTL, SYNCH DECADE RATE MULTIPLIER	454884	01295	SN74167N	REF		
U11	IC, TTL LO-PWR SCHTKY OCTAL "D: TYPE F/F	454892	01295	SN74LS273N	REF		
U12	IC, 8-BIT ADDRESSABLE LATCH	419242	01295	SN74LS259N	REF		
U13	IC, DUAL, "D" TYPE, EDGE TRIGGERED, F/F	418269	01295	SN74S74N	1	1	
U14	IC, TTL, HEX INVERTER	293076	01295	SN74H04N	1	1	
U15Ø	IC, TTL, SYNCH DECADE RATE MULTIPLIER	454884	01295	SN74167N	REF		
U16	IC, TTL LO-PWR SCHTKY OCTAL "D: TYPE F/F	454892	01295	SN74LS273N	REF		
U17	IC, 8-BIT ADDRESSABLE LATCH	419242	01295	SN74LS259N	REF		
U18	IC, TTL, QUAD 2-IN, NAND GATE	363580	01295	SN74S00N	2	1	
U19	IC, TTL, QUAD 2-IN, NAND GATE	363580	01295	SN74S00N	REF		
U20Ø	IC, TTL, SYNCH DECADE RATE MULTIPLIER	454884	01295	SN74167N	REF		
U21	IC, TTL, SCHOTTKY, QUAD 2-IN, P-NOR GATE	403626	01295	SN74S02N	1	1	
U22	IC, TTL, PRESET DECADE OR BINARY COUNTER	473835	01295	SN74S196N	1	1	
U23	IC, TTL MSI, DECADE COUNTER	402545	01295	SN74LS90N	2	1	
U24	IC, LINEAR, OP-AMP	472779	12040	LF386N	1	1	
U25	IC, ECL, TRIPLE LINE RECEIVER 16-PIN DIP	369702	18324	N10116B	2	1	
U26	RESISTOR NETWORK, 510 +/-2%, 1/8W	447482	89536	447482	2	1	
U27	IC, MIXER, 1 - 500 MHZ RANGE	528265	15542	SBL-1	2	1	
U28	IC, MIXER, 1 - 500 MHZ RANGE	528265	15542	SBL-1	REF		
U29	IC, ECL, DUAL TYPE "D", M/S, F/F	525345	04713	MC10231L	1	1	
U30	IC, LINEAR, OP-AMP, J-FET INPUT	483438	89536	483438	1	1	
U31	RESISTOR NETWORK, 10K 16-PIN DIP	501841	89536	501841	1	1	
U32	IC, ECL, BI-QUINARY COUNTER	525337	04713	MC10138L	1	1	
U33	IC, TTL MSI, DECADE COUNTER	402545	01295	SN74LS90N	REF		
U34	RESISTOR NETWORK, 510 +/-2%, 1/8W	447482	89536	447482	REF		
U35	IC, ECL, TRIPLE LINE RECEIVER 16-PIN DIP	369702	18324	N10116B	REF		
XU1	SOCKET, IC, 14-PIN	370304	12040	MM74C906N	13		
XU2	SOCKET, IC, 14-PIN	370304	12040	MM74C906N	REF		
XU3	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	13		
XU4	SOCKET, IC, 14-PIN	370304	12040	MM74C906N	REF		
XU5	SOCKET, IC, 14-PIN	370304	12040	MM74C906N	REF		
XU6	SOCKET, IC, 20-PIN	454421	01295	C932002	3		
XU7	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU8	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU9	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU10	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU11	SOCKET, IC, 20-PIN	454421	01295	C932002	REF		
XU12	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		

Table 6-14. A3A7 Sub Synthesizer PCB Mixer (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
XU13	SOCKET, IC, 14-PIN	370304	12040	MM74C906N	REF		
XU14	SOCKET, IC, 14-PIN	370304	12040	MM74C906N	REF		
XU15	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU16	SOCKET, IC, 20-PIN	454421	01295	C932002	REF		
XU17	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU18	SOCKET, IC, 14-PIN	370304	12040	MM74C906N	REF		
XU19	SOCKET, IC, 14-PIN	370304	12040	MM74C906N	REF		
XU20	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU21	SOCKET, IC, 14-PIN	370304	12040	MM74C906N	REF		
XU22	SOCKET, IC, 14-PIN	370304	12040	MM74C906N	REF		
XU23	SOCKET, IC, 14-PIN	370304	12040	MM74C906N	REF		
XU24	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	1		
XU25	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU27	SOCKET, SINGLE SPRING TYPE COPPER	392944	00779	3-332070-0	16		
XU28	SOCKET, SINGLE SPRING TYPE COPPER	392944	00779	3-332070-0	REF		
XU29	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU30	SOCKET, IC, 14-PIN	370304	12040	MM74C906N	REF		
XU32	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU33	SOCKET, IC, 14-PIN	370304	12040	MM74C906N	REF		
XU35	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		

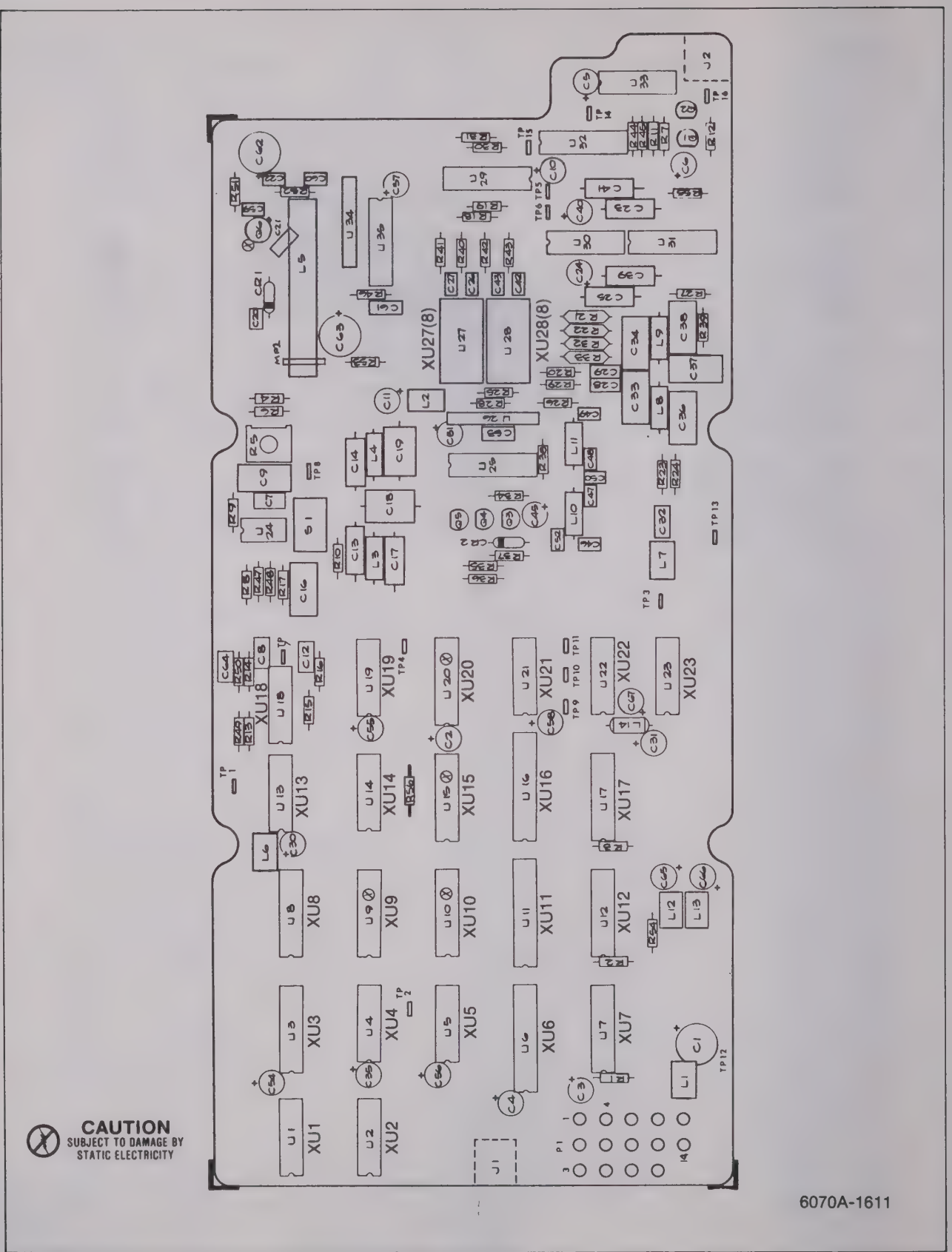


Figure 6-14. A3A7 Sub Synthesizer PCB Mixer

Table 6-15. A3A8 Synthesizer Control Buffer PCB Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
A3A8Ⓧ	SYNTHESIZER CONTROL BUFFER PCB ASSEMBLY FIGURE 6-15 (6070A-4020T)	463638	89536	463638	REF		
C1	CAP, CER, 0.22 UF +/-20%, 50V	309849	72982	8131-050-651-022	5		
C2	CAP, CER, 0.22 UF +/-20%, 50V	309849	72982	8131-050-651-022	REF		
C3	CAP, CER, 0.22 UF +/-20%, 50V	309849	72982	8131-050-651-022	REF		
C4	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	1		
C5	CAP, CER, 0.22 UF +/-20%, 50V	309849	72982	8131-050-651-022	REF		
C6	CAP, CER, 0.22 UF +/-20%, 50V	309849	72982	8131-050-651-022	REF		
C7	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	2		
C8	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C9	CAP, TA, 2.2 UF +/-20%, 20V	161927	56289	196D2225X0020HA1	4		
C10	CAP, TA, 2.2 UF +/-20%, 20V	161927	56289	196D2225X0020HA1	REF		
C11	CAP, TA, 2.2 UF +/-20%, 20V	161927	56289	196D2225X0020HA1	REF		
C12	CAP, TA, 2.2 UF +/-20%, 20V	161927	56289	196D2225X0020HA1	REF		
C13	CAP, CER, 22 PF +/-2%, 100V	512871	89536	512871	1		
CR1	DIODE, SI, SWITCHING	313247	28480	HP5082-6264	2	1	
CR2	DIODE, SI, SWITCHING	313247	28480	HP5082-6264	REF		
CR3	DIODE, ZENER	357848	04713	SZG2011B	1	1	
L1	CHOKE, 6-TURN	320911	89536	320911	16		
L2	CHOKE, 6-TURN	320911	89536	320911	REF		
L3	CHOKE, 6-TURN	320911	89536	320911	REF		
L4	CHOKE, 6-TURN	320911	89536	320911	REF		
L5	CHOKE, 6-TURN	320911	89536	320911	REF		
L6	CHOKE, 6-TURN	320911	89536	320911	REF		
L7	CHOKE, 6-TURN	320911	89536	320911	REF		
L8	CHOKE, 6-TURN	320911	89536	320911	REF		
L9	CHOKE, 6-TURN	320911	89536	320911	REF		
L10	CHOKE, 6-TURN	320911	89536	320911	REF		
L11	CHOKE, 6-TURN	320911	89536	320911	REF		
L12	CHOKE, 6-TURN	320911	89536	320911	REF		
L13	CHOKE, 6-TURN	320911	89536	320911	REF		
L14	CHOKE, 6-TURN	320911	89536	320911	REF		
L15	CHOKE, 6-TURN	320911	89536	320911	REF		
L16	CHOKE, 6-TURN	320911	89536	320911	REF		
P1	CONNECTOR, 30 POSITION	529230	00779	86396-3	1		
P2	COMPONENT LEAD, SPRING TYPE	544056	00779	50871-1	36		
P3	COMPONENT LEAD, SPRING TYPE	544056	00779	50871-1	REF		
P4	COMPONENT LEAD, SPRING TYPE	544056	00779	50871-1	REF		
R1	RES, MTL. FILM, 1K +/-1%, 1/8W	168229	91637	CMF551001F	1		
R2	RES, MTL. FILM, 1.78K +/-1%, 1/8W	344366	91637	CMF551781F	1		
R3	RES, MTL. FILM, 10K +/-10%, 1/8W	168260	91637	CMF55103	1		
R4	RES, MTL. FILM, 2.80K +/-1%, 1/8W	325670	91637	CMF552801F	1		
R5	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	89536	348839	1		
R6	RES, DEP. CAR, 220K +/-5%, 1/4W	348953	89536	348953	1		
TP1-TP6	CONNECTOR, TEST POINT	512889	02660	62395-1834	6		
U1	IC, 8-BIT ADDRESSABLE LATCH	419242	01295	SN74LS259N	4	1	
U2	IC, 8-BIT ADDRESSABLE LATCH	419242	01295	SN74LS259N	REF		
U3Ⓧ	IC, TTL, QUAD, 2-INPUT POS OR GATE	393108	01295	SN74LS32N	1	1	
U4	IC, 8-BIT ADDRESSABLE LATCH	419242	01295	SN74LS259N	REF		

Table 6-15. A3A8 Synthesizer Control Buffer PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
U5	IC, LINEAR, OP-AMP	495051	18324	NE5534N	1	1	
U6⊘	IC, C-MOS, 10-BIT D/A CONVERTER	507566	24355	AD7533LN	2	1	
U7⊘	IC, C-MOS, 10-BIT D/A CONVERTER	507566	24355	AD7533LN	REF		
U8	IC, TTL, LO-PWR, 3-8 LINE DECODER	407585	01295	SN74LS138N	1	1	
U9	IC, OCTAL BUFFERS & LINE DRIVERS	429035	01295	SN74LS244N	1	1	
U10	IC, 8-BIT ADDRESSABLE LATCH	419242	01295	SN74LS259N	REF		
U11	IC, LO-PWR, SCHOTTCKY TRI-ST OCTAL, BFR.	429902	12040	DM81LS95N	1	1	
U12⊘	IC, LINEAR, LO-NOISE DUAL OP-AMP	504720	18324	NE5532FE	1	1	
XU1	SOCKET, IC, 16-PIN DIP	370312	91506	316-AG39D	7		
XU2	SOCKET, IC, 16-PIN DIP	370312	91506	316-AG39D	REF		
XU3	SOCKET, 14-PIN	370304	12040	MM74C906N	1		
XU4	SOCKET, IC, 16-PIN DIP	370312	91506	316-AG39D	REF		
XU5	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	2		
XU6	SOCKET, IC, 16-PIN DIP	370312	91506	316-AG39D	REF		
XU7	SOCKET, IC, 16-PIN DIP	370312	91506	316-AG39D	REF		
XU8	SOCKET, IC, 16-PIN DIP	370312	91506	316-AG39D	REF		
XU9	SOCKET, IC, 20-PIN	454421	01295	C932002	2		
XU10	SOCKET, IC, 16-PIN DIP	370312	91506	316-AG39D	REF		
XU11	SOCKET, IC, 20-PIN	454421	01295	C932002	REF		
XU12	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	REF		

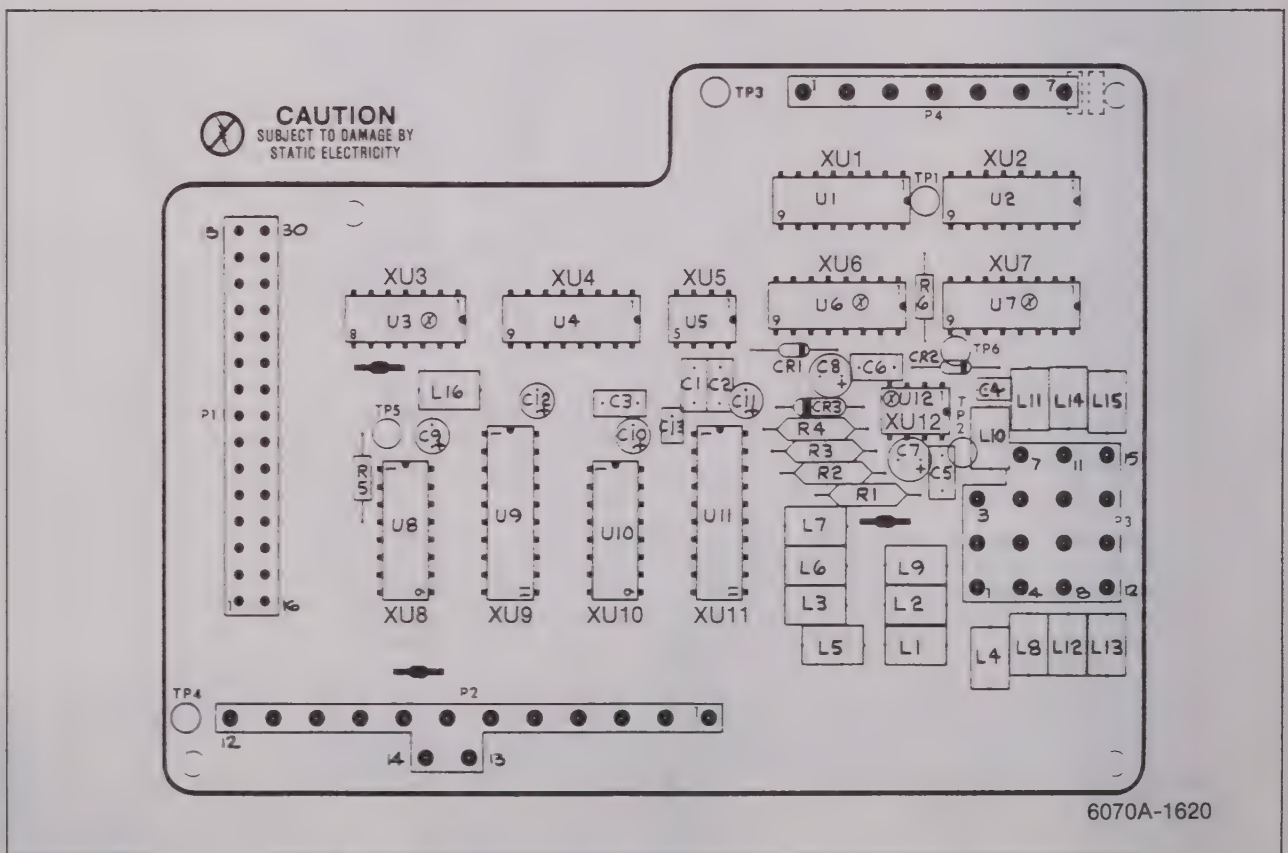


Figure 6-15. A3A8 Synthesizer Control Buffer PCB Assembly

Table 6-16. A3A9 Synthesizer Distribution PCB Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
A3A9Ø	SYNTHESIZER DISTRIBUTION PCB ASSEMBLY FIGURE 6-16 (6070A-4025T)	463687	89536	463687	REF		
C1	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	3		
C2	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C3	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C4	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	1		
C5	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	6		
C6	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C7	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	1		
C8	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C9	CAP, VAR, 4.5 - 50 PF, 250V	321117	73899	DVJ305A	1		
C10	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C11	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C12	CAP, POLY, 0.12 UF +/-5%, 100V	461582	73445	C280MAH/A120K	1		
C13	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
CR1	DIODE, SI, SMALL SIGNAL	313247	28484	HP5082-6264	2		
CR2	DIODE, SI, SMALL SIGNAL	313247	28484	HP5082-6264	REF		
J14	CONNECTOR, POST	267500	00779	87022-1	25		
J15	CONNECTOR, 6-PIN	512178	27264	09-80-1063	1		
J16	CONNECTOR, RF, SMB	512095	16733	702033	1		
P1	CONNECTOR, POST	267633	00779	86144-1	30		
P2	COMPONENT LEAD, SPRING TYPE	544056	00779	50871-1	27		
P3	COMPONENT LEAD, SPRING TYPE	544056	00779	50871-1	REF		
R1	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	1		
R2	RES, DEP. CAR, 620K +/-5%, 1/4W	442509	80031	CR251-4-5P620K	1		
R3	RES, DEP. CAR, 11K +/-5%, 1/4W	441360	80031	CR251-4-5P11K	1		
R4	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	1		
R5	RES, DEP. CAR, 510 +/-5%, 1/4W	441600	80031	CR251-4-5P510E	1		
R6	RES, DEP. CAR, 4.7K +/-5%, 1/4W	348821	80031	CR251-4-5P4K7	2		
R7	RES, DEP. CAR, 22K +/-5%, 1/4W	348870	80031	CR251-4-5P22K	1		
R8	RES, VAR, 100K +/-10%, 1/2W	369520	11236	360T-104A	1		
R9	RES, DEP. CAR, 4.7K +/-5%, 1/4W	348821	80031	CR251-4-5P4K7	REF		
R10	RES, VAR, 100 +/-10%, 1/2W	275735	11236	360T-101A	1		
R11	RES, MTL. FILM, 909 +/-1%, 1/8W	312629	91637	CMF559090F	1		
TP1	CONNECTOR, TEST POINT	512889	00779	62395-1	2		
TP2	CONNECTOR, TEST POINT	512889	00779	62395-1	REF		
U1	IC, 8-BIT ADDRESSABLE LATCH	419242	01295	SN74LS259N	3	1	
U2	IC, TTL, SCHOTTKY 3-8 LINE DECODER	407585	01295	SN74LS138N	1	1	
U3Ø	IC, C-MOS, 10 BIT D/A CONVERTER	524868	24355	AD7533JN	1	1	
U4	IC, 8-BIT ADDRESSABLE LATCH	419242	01295	SN74LS259N	REF		
U5	IC, LINEAR, OP-AMP	472779	12040	LF386N	1	1	
U6Ø	IC, C-MOS, RETRIGGERABLE/RESETTABLE	393512	04713	MC14528CP	1	1	
U7Ø	IC, C-MOS, 10 BIT D/A CONVERTER	507558	24355	AD7533KN	1	1	
U8Ø	IC, LINEAR, OP-AMP	495051	18324	NE5534N	1	1	
U9Ø	IC, LO-PWR, SCHOTTKY TRI-ST OCTAL BFR	429902	12040	DMB1LS95N	1	1	
U10	IC, 8-BIT ADDRESSABLE LATCH	419242	01295	SN74LS259N	REF		
U11	IC TTL, LO-PWR SCHOTTKY, DATA SELECT	407577	01295	SN74LS251N	1	1	
U12	IC, LINEAR, QUAD COMPARATOR	387233	12040	LM339N	1	1	
U13	IC, OCTAL BUFFERS & LINE DRIVERS	429035	01295	SN74LS244N	1	1	

Table 6-16. A3A9 Synthesizer Distribution PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
XU1	SOCKET, 16-PIN	370312	91506	316-AG39D	8		
XU2	SOCKET, 16-PIN	370312	91506	316-AG39D	REF		
XU3	SOCKET, 16-PIN	370312	91506	316-AG39D	REF		
XU4	SOCKET, 16-PIN	370312	91506	316-AG39D	REF		
XU5	SOCKET, 8-PIN	478016	91506	308-AG39D	2		
XU6	SOCKET, 16-PIN	370312	91506	316-AG39D	REF		
XU7	SOCKET, 16-PIN	370312	91506	316-AG39D	REF		
XU8	SOCKET, 8-PIN	478016	91506	308-AG39D	REF		
XU9	SOCKET, 20-PIN	454421	01295	C932002	2		
XU10	SOCKET, 16-PIN	370312	91506	316-AG39D	REF		
XU11	SOCKET, 16-PIN	370312	91506	316-AG39D	REF		
XU12	SOCKET 14-PIN	370304	12040	MM74C906N	1		
XU13	SOCKET, 20-PIN	454421	01295	C932002	REF		

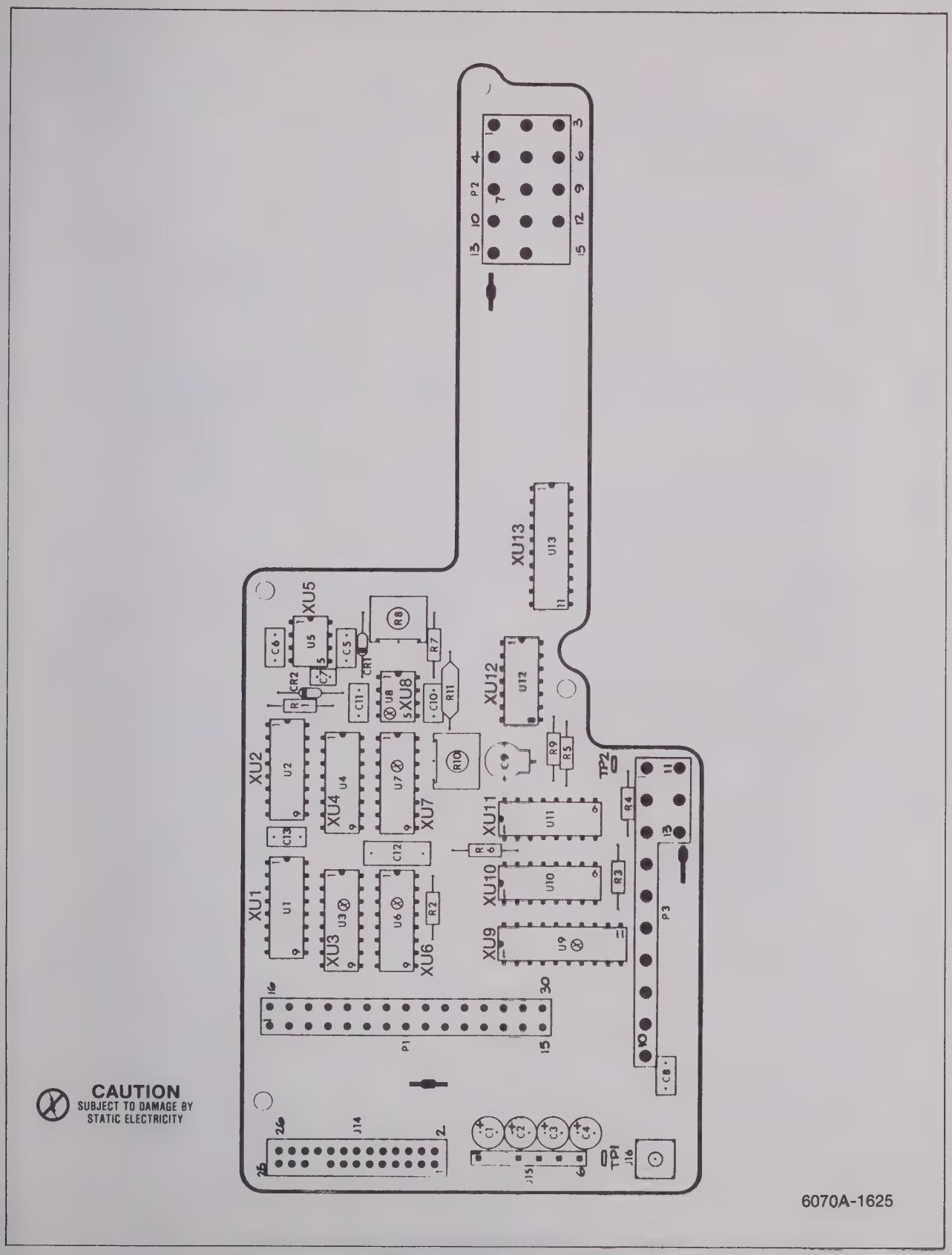


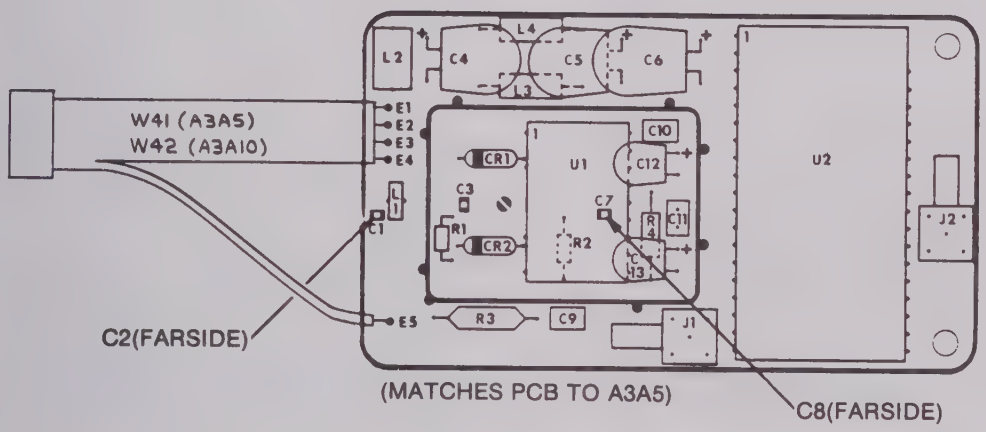
Figure 6-16. A3A9 Synthesizer Distribution PCB Assembly

Table 6-17. A3A10 VCO Resonator PCB Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
A3A10	VCO RESONATOR PCB ASSEMBLY FIGURE 6-17 (6070A-4012T) (MATCHED TO A3A5 PCB)	463364	89536	463364	REF		1
C1	CAP, CHIP, 1000 PF +/-5%, 50V	484378	89536	484378	2		
C2	CAP, CHIP, 1000 PF +/-5%, 50V	484378	89536	484378	REF		
C3	CAP, CHIP, 22 PF +/-5%, 50V	484360	89536	484360	1		
C4	CAP, TA, 68 UF +/-20%, 15V	193615	56289	196D686X0015LA3	1		
C5	CAP, TA, 82 UF +/-20%, 20V	357392	12954	D82GS2D20M	2		
C6	CAP, TA, 82 UF +/-20%, 20V	357392	12954	D82GS2D20M	REF		
C7	CAP, CHIP, 330 PF +/-5%, 50V	512038	89536	512038	2		
C8	CAP, CHIP, 330 PF +/-5%, 50V	512038	89536	512038	REF		
C9	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	3		
C10	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C11	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C12	CAP, TA, 22 UF +/-20%, 15V	423012	56289	196D226X0015KA1	2		
C13	CAP, TA, 22 UF +/-20%, 15V	423012	56289	196D226X0015KA1	REF		
CR1	DIODE, VARACTOR TUNING (SET OF 4)	534875	91462	DKV6534CM4	1	1	2
CR2	PART OF CR1						2
J1	CONN, COAX, SNAP-ON RECPT, PCB MOUNT	353243	98291	51-053-0000	2		
J2	CONN, COAX, SNAP-ON RECPT, PCB MOUNT	353243	98291	51-053-0000	REF		
L1	INDUCTOR, 10T	463448	89536	463448	1		
L2	CHOKE, 6-TURN	320911	89536	320911	1		
L3	CHOKE, RF, 180 UH +/-5%, 300 MA	174771	72259	WEE-180	2		
L4	CHOKE, RF, 180 UH +/-5%, 300 MA	174771	72259	WEE-180	REF		
R1	RES, COMP, 22 +/-5%, 1/8W	474767	01121	BB1-82205	2		
R2	RES, COMP, 22 +/-5%, 1/8W	474767	01121	BB1-82205	REF		
R3	RES, MTL. FILM, 84.5 +/-1%, 1/8W	236851	91637	CMF558452F	1		
R4	RES, DEP. CAR, 560 +/-5%, 1/4W	385948	80031	CR251-4-5P560E	1		
U1	VCO, HYBRID ASSEMBLY	492793	89536	492793	1	1	
U2	VCO BUFFER, HYBRID ASSEMBLY	492736	89536	492736	1	1	
W42	CABLE ASSEMBLY	508986	89536	508986	1		

1 BEFORE ORDERING SPARE PARTS OR SPARE PCB ASSEMBLIES, PLEASE CONTACT YOUR NEAREST JOHN FLUKE SERVICE CENTER FOR INFORMATION

2 MATCHED TO CR1/CR2 LOCATED ON ASSEMBLY A3A5.



6070A-1612

Figure 6-17. A3A10 VCO Resonator PCB Assembly

Table 6-18. A4 Output Module Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
A4Ø	OUTPUT MODULE ASSEMBLY FIGURE 6-18 (6070A-4201)	497172	89536	497172	REF		
A4A1	HEADER, MOD OSC/MOD PCB ASSEMBLY (NOT ILLUSTRATED)	578567	89536	578567	1		
A4A2Ø	MODULATION OSCILLATOR PCB ASSEMBLY	469593	89536	469593	1		
A4A3	ATTENUATOR PCB ASSEMBLY	462432	89536	462432	1		
A4A4Ø	MODULATOR DIVIDER PCB ASSEMBLY	463596	89536	463596	1		
A4A6Ø	X2 OUTPUT AMPLIFIER PCB ASSEMBLY (USED ON THE 6071A ONLY)	546465	89536	546465	1		
A4A7Ø	OUTPUT AMPLIFIER PCB ASSEMBLY (USED ON THE 6070A ONLY)	463505	89536	463505	1		
A4A8Ø	HETRODYNE OSCILLATOR PCB ASSEMBLY	463588	89536	463588	1		
A4A9	HETRODYNE CONVERTER PCB ASSEMBLY	463562	89536	463562	1		
A4A10Ø	MOD DISTRIBUTION PCB ASSEMBLY	463570	89536	463570	1		
H1	SCREW, CAP, 6-32 X 1/4	528281	89536	528281	8		
H2	SCREW, FHP, 6-32 X 3/4	114504	89536	114504	6		
H4	SCREW, PHP, 6-32 X 9/32	544122	89536	544122	51		
H5	SCREW, PHP, 6-32 X 5/8	412841	89536	412841	3		
H8	WASHER, SPRING STEEL	571968	89536	571968	34		
H9	WASHER, SPLIT LOCK #6	110692	89536	110692	1		
MP1	BRACKET, HEATSINK	577155	89536	577155	1		
MP2	CAN, ATTEN. PLATED	604009	89536	604009	6		
MP3	CAN, MODULE DIVIDER	535435	89536	535435	1		
MP4	SPACER	103499	89536	103499	1		
MP5	AIDE, PCB PULL	541730	89536	541730	30		
MP7	SPACER, X2 HEATSINK	536078	89536	536078	6		
MP8	SPACER, MODULE DIVIDER	585372	89536	585372	1		
MP9	INSERT, FEED THRU	516252	89536	516252	1		
W43	CABLE ASSEMBLY	524702	89536	524702	1		

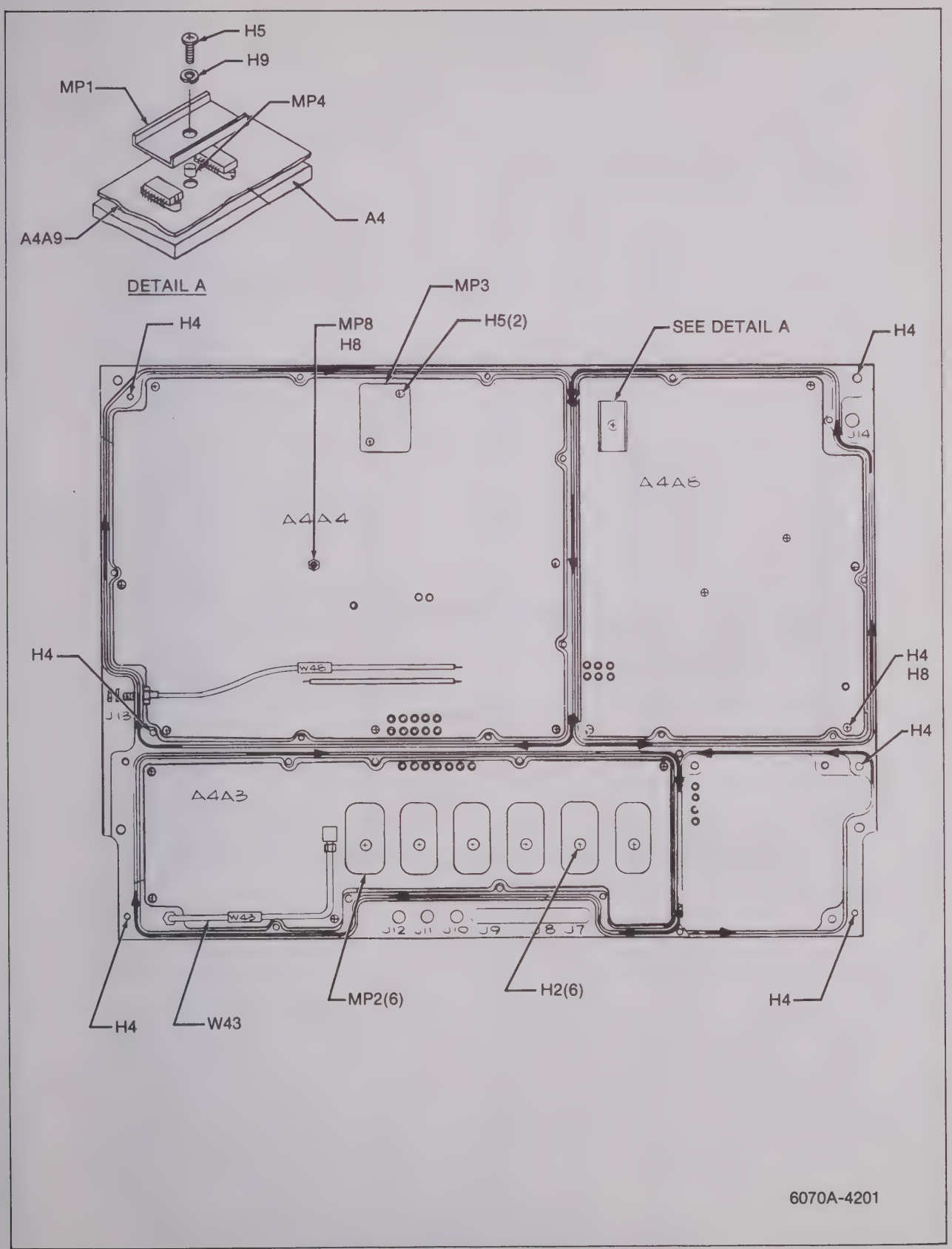


Figure 6-18. A4 Output Module Assembly

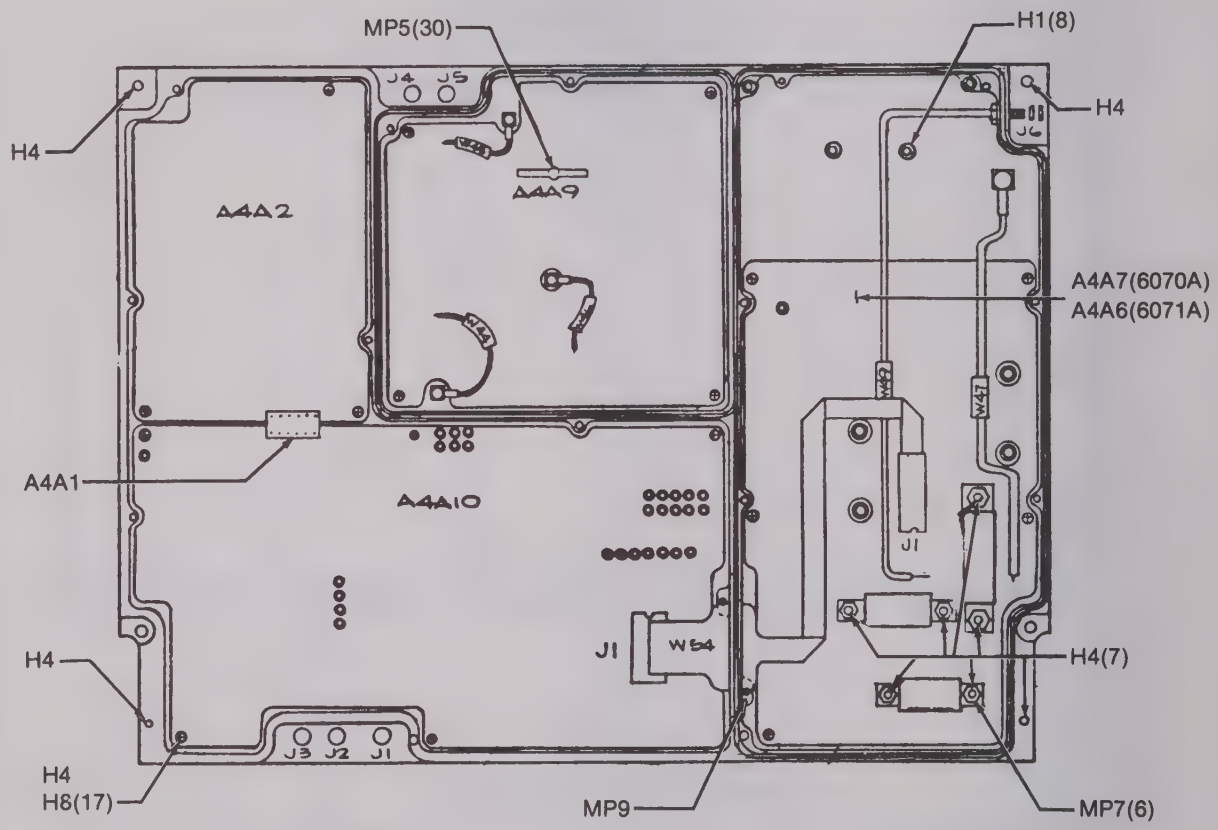


Figure 6-18. A4 Output Module Assembly (cont)

Table 6-19. A4A2 Modulation Oscillator PCB Assembly

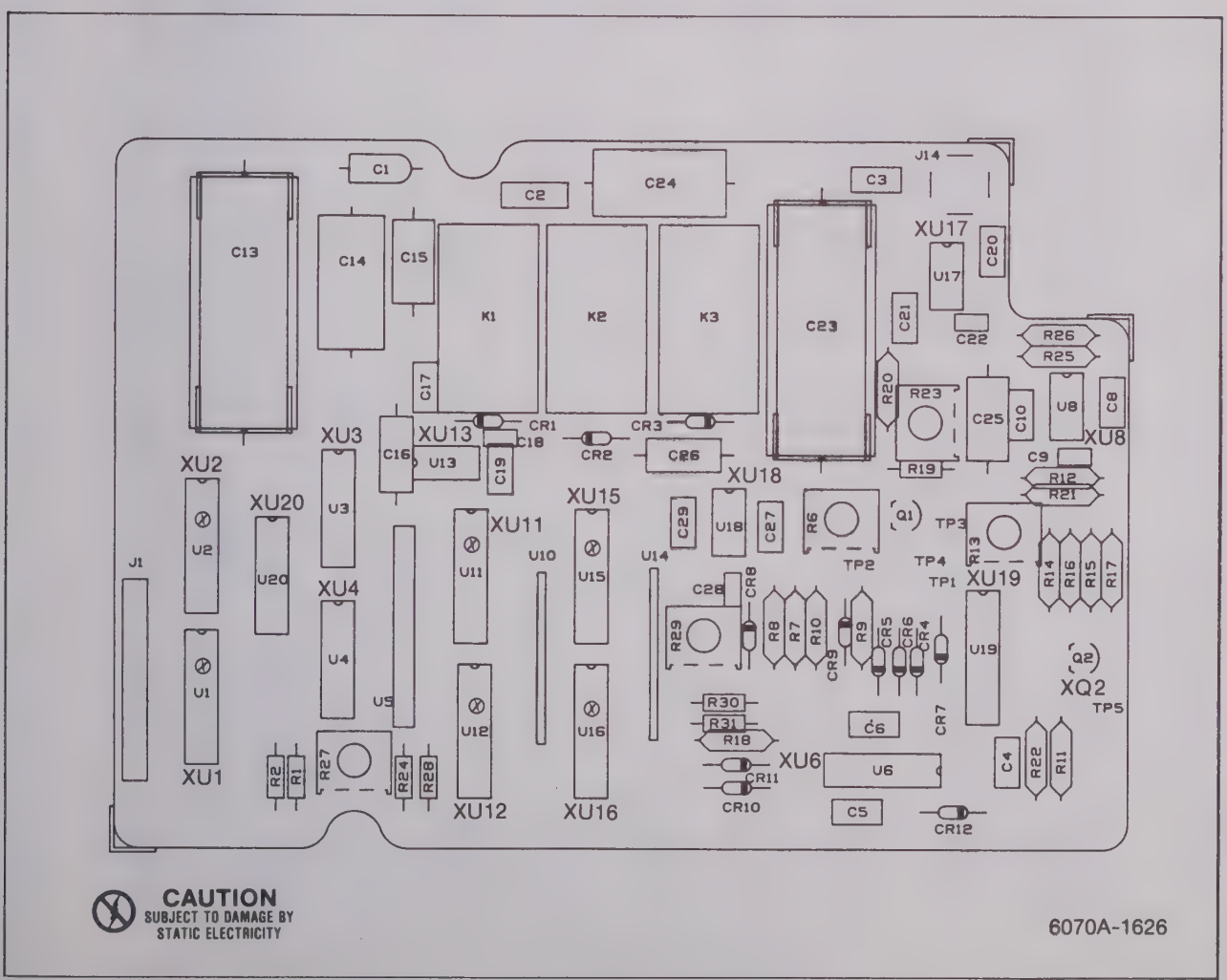
REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
A4A2Ⓧ	MODULATION OSCILLATOR PCB ASSEMBLY FIGURE 6-19 (6070A-4026T)	469593	89536	469593	REF		
C1	CAP, TA, 0.68 UF +/-10%, 35V	182790	56289	150D684X9035A2	1		
C2	CAP, CER, 0.068 UF +/-5%, 50V	542902	89536	542902	1		
C3	CAP, CER, 6800 PF +/-5%, 50V	542894	89536	542894	1		
C4	CAP, CER, 680 PF +/-5%, 50V	528273	89536	528273	1		
C5	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	10		
C6	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C8	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C9	CAP, CER, 22 PF +/-2%, 100V	512871	89536	512871	4		
C10	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C13	CAP, POLY, 0.793 UF +/-1%, 50V	413591	89536	413591	2		
C14	CAP, POLY, 0.0786 UF +/-1%, 50V	422998	89536	422980	2		
C15	CAP, POLY, 0.00715 UF +/-1%	422980	89536	422980	2		
C16	CAP, POLY, 794 PF +/-1%, 63V	528398	12954	B31063/794/1/63	2		
C17	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C18	CAP, CER, 22 PF +/-2%, 100V	512871	89536	512871	REF		
C19	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C20	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C21	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C22	CAP, CER, 22 PF +/-2%, 100V	512871	89536	512871	REF		
C23	CAP, POLY, 0.793 UF +/-1%, 50V	413591	89536	413591	REF		
C24	CAP, POLY, 0.0786 UF +/-1%, 50V	422998	89536	422980	REF		
C25	CAP, POLY, 0.00715 UF +/-1%	422980	89536	422980	REF		
C26	CAP, POLY, 794 PF +/-1%, 63V	528398	12954	B31063/794/1/63	REF		
C27	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C28	CAP, CER, 22 PF +/-2%, 100V	512871	89536	512871	REF		
C29	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
CR1	DIODE, HI-SPEED SWITCHING	203323	07910	1N4448	4	1	
CR2	DIODE, HI-SPEED SWITCHING	203323	07910	1N4448	REF		
CR3	DIODE, HI-SPEED SWITCHING	203323	07910	1N4448	REF		
CR4	DIODE, SI, SMALL SIGNAL	313247	28484	HP5082-6264	7	2	
CR5	DIODE, SI, SMALL SIGNAL	313247	28484	HP5082-6264	REF		
CR6	DIODE, SI, SMALL SIGNAL	313247	28484	HP5082-6264	REF		
CR7	DIODE, SI, SMALL SIGNAL	313247	28484	HP5082-6264	REF		
CR8	DIODE, ZENER	357848	04713	SZG20118	1	1	
CR9	DIODE, SI, SMALL SIGNAL	313247	28484	HP5082-6264	REF		
CR10	DIODE, SI, SMALL SIGNAL	313247	28484	HP5082-6264	REF		
CR11	DIODE, SI, SMALL SIGNAL	313247	28484	HP5082-6264	REF		
CR12	DIODE, HI-SPEED SWITCHING	203323	07910	1N4448	REF		
J1	CONNECTOR	530261	00779	87334-4	1		
J14	CONNECTOR, RF, SMB	512095	16733	702033	1		
K1	RELAY, DRY REED	484444	21317	E51AX4	3	1	
K2	RELAY, DRY REED	484444	21317	E51AX4	REF		
K3	RELAY, DRY REED	484444	21317	E51AX4	REF		
Q1	TRANSISTOR, FET	413690	89536	413690	1	1	
Q2	TRANSISTOR, FET	477448	89536	477448	1	1	
R1	RES, DEP. CAR, 3.3K +/-5%, 1/4W	348813	80031	CR251-4-5P3K3	1		
R2	RES, DEP. CAR, 1.5K +/-5%, 1/4W	343418	80031	CR251-4-5P1K5	1		

Table 6-19. A4A2 Modulation Oscillator PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
R6	RES, VAR, +/-10%, 1/2W	309674	75378	360T-103A	1		
R7	RES, MTL. FILM, 42.2K +/-1%, 1/8W	221655	91637	CMF554222F	1		
R8	RES, MTL. FILM, 2.80K +/-1%, 1/8W	325670	91637	CMF552801F	1		
R9	RES, MTL. FILM, 5.49K +/-1%, 1/8W	334565	91637	CMF555491F	1		
R10	RES, MTL. FILM, 100K +/-1%, 1/8W	248807	91637	CMF551003F	3		
R11	RES, MTL. FILM, 3.32K +/-1%, 1/8W	312652	91637	CMF553321F	1		
R12	RES, MTL. FILM, 49.9K +/-1%, 1/8W	268821	91637	CMF554992F	1		
R13	RES, VAR, 1K +/-10%, 1/2W	275750	11236	360T102A	1		
R14	RES, MTL. FILM, 2.21K +/-1%, 1/8W	347476	91637	CMF552211F	1		
R15	RES, MTL. FILM, 100K +/-1%, 1/8W	248807	91637	CMF551003F	REF		
R16	RES, MTL. FILM, 475 +/-1%, 1/8W	320010	91637	CMF554750F	1		
R17	RES, MTL. FILM, 100K +/-1%, 1/8W	248807	91637	CMF551003F	REF		
R18	RES, MTL. FILM, 3.16K +/-1%, 1/8W	235291	91637	CMF553161F	1		
R19	RES, DEP. CAR, 22K +/-5%, 1/4W	348870	80031	CR251-4-5P22K	1		
R20	RES, MTL. FILM, 4.99K +/-1%, 1/8W	168252	91637	CMF554991F	4		
R21	RES, MTL. FILM, 4.99K +/-1%, 1/8W	168252	91637	CMF554991F	REF		
R22	RES, MTL. FILM, 316K +/-1%, 1/8W	289496	91637	CMF553163F	1		
R23	RES, VAR, 100K +/-10%, 1/2W	369520	11236	360T-104A	1		
R24	RES, DEP. CAR, 100K +/-5%, 1/4W	348920	80031	CR251-4-5P100K	2		
R25	RES, MTL. FILM, 4.99K +/-1%, 1/8W	168252	91637	CMF554991F	REF		
R26	RES, MTL. FILM, 4.99K +/-1%, 1/8W	168252	91637	CMF554991F	REF		
R27	RES, VAR, 20K +/-10%, 1/2W	335760	11236	360T203A	2		
R28	RES, DEP. CAR, 1M +/-5%, 1/4W	348987	80031	CR251-4-5P1M	2		
R29	RES, VAR, 20K +/-10%, 1/2W	335760	11236	360T203A	REF		
R30	RES, DEP. CAR, 100K +/-5%, 1/4W	348920	80031	CR251-4-5P100K	REF		
R31	RES, DEP. CAR, 1M +/-5%, 1/4W	348987	80031	CR251-4-5P1M	REF		
TP1	CONNECTOR, TEST POINT	512889	00779	62395-1	5		
TP2	CONNECTOR, TEST POINT	512889	00779	62395-1	REF		
TP3	CONNECTOR, TEST POINT	512889	00779	62395-1	REF		
TP4	CONNECTOR, TEST POINT	512889	00779	62395-1	REF		
TP5	CONNECTOR, TEST POINT	512889	00779	62395-1	REF		
U1⊗	IC, 8-BIT ADDRESSABLE LATCH	419242	01295	SN74LS259N	2	1	
U2⊗	IC, 8-BIT ADDRESSABLE LATCH	419242	01295	SN74LS259N	REF		
U3	IC, LINEAR, QUAD COMPARATOR	387233	12040	LM339N	2	1	
U4	IC, LINEAR, QUAD COMPARATOR	387233	12040	LM339N	REF		
U5	RESISTOR NETWORK	414003	89536	414003	1	1	
U6	IC, LINEAR, OP-AMP, J-FET INPUT	483438	89536	483438	1	1	
U8	IC, LINEAR OP-AMP	495051	18324	NE5534N	4	1	
U10	IC, HYBRID ASSEMBLY	480756	89536	480756	2	1	
U11⊗	IC, LINEAR, D-MOS FET QUAD ANALOG	507228	18324	SD50021J	4	1	
U12⊗	IC, LINEAR, D-MOS FET QUAD ANALOG	507228	18324	SD50021J	REF		
U13	IC, LINEAR OP-AMP	495051	18324	NE5534N	REF		
U14	IC, HYBRID ASSEMBLY	480756	89536	480756	REF		
U15⊗	IC, LINEAR, D-MOS FET QUAD ANALOG	507228	18324	SD50021J	REF		
U16⊗	IC, LINEAR, D-MOS FET QUAD ANALOG	507228	18324	SD50021J	REF		
U17	IC, LINEAR OP-AMP	495051	18324	NE5534N	REF		
U18	IC, LINEAR OP-AMP	495051	18324	NE5534N	REF		
U19	RESISTOR NETWORK	501841	89536	501841	1	1	
U20	IC, TTL, HEX INVERTER	407593	01295	SN7406N	1	1	
XQ2	SOCKET, TRANSISTOR	285262	71785	1-33-23-92-045	1		

Table 6-19. A4A2 Modulation Oscillator PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
XU1	SOCKET, IC 16-PIN	276535	91506	316-AG39D	7		
XU2	SOCKET, IC 16-PIN	276535	91506	316-AG39D	REF		
XU3	SOCKET, IC 14-PIN	276527	91507	314-AG39D	4		
XU4	SOCKET, IC 14-PIN	276527	91507	314-AG39D	REF		
XU6	SOCKET, IC 14-PIN	276527	91507	314-AG39D	REF		
XU8	SOCKET, IC 8-PIN	478016	91506	308-AG39D	4		
XU11	SOCKET, IC 16-PIN	276535	91506	316-AG39D	REF		
XU12	SOCKET, IC 16-PIN	276535	91506	316-AG39D	REF		
XU13	SOCKET, IC 8-PIN	478016	91506	308-AG39D	REF		
XU15	SOCKET, IC 16-PIN	276535	91506	316-AG39D	REF		
XU16	SOCKET, IC 16-PIN	276535	91506	316-AG39D	REF		
XU17	SOCKET, IC 8-PIN	478016	91506	308-AG39D	REF		
XU18	SOCKET, IC 8-PIN	478016	91506	308-AG39D	REF		
XU19	SOCKET, IC 16-PIN	276535	91506	316-AG39D	REF		
XU20	SOCKET, IC 14-PIN	276527	91507	314-AG39D	REF		



CAUTION
SUBJECT TO DAMAGE BY STATIC ELECTRICITY

6070A-1626

Figure 6-19. A4A2 Modulation Oscillator PCB Assembly

Table 6-20. A4A3 Attenuator PCB Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
A4A3	ATTENUATOR PCB ASSEMBLY FIGURE 6-20 (6070A-4005T)	462432	89536	462432	REF		1
C1	CAP, CER, .001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	18		
C2	CAP, CER, .001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C3	CAP, CER, .001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C4	CAP, CER, .001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C5	CAP, CER, .001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C6	CAP, CER, .001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C8	CAP, CER, .001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C9	CAP, CER, .001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C10	CAP, CER, .001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C11	CAP, CER, .001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C12	CAP, CER, .001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C13	CAP, CER, .001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C15	CAP, CER, .001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C16	CAP, CER, .001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C17	CAP, CER, .001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C18	CAP, CER, .001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C19	CAP, CER, .001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C20	CAP, CER, .001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C22	CAP, TA, 22 UF +/-20%, 35V	394775	56289	196D226X0035TE4	1		
CR1	DIODE, LO-CAP, LO-LEAK	375907	07263	FD7222	6	2	
CR2	DIODE, LO-CAP, LO-LEAK	375907	07263	FD7222	REF		
CR3	DIODE, LO-CAP, LO-LEAK	375907	07263	FD7222	REF		
CR4	DIODE, LO-CAP, LO-LEAK	375907	07263	FD7222	REF		
CR5	DIODE, LO-CAP, LO-LEAK	375907	07263	FD7222	REF		
CR6	DIODE, LO-CAP, LO-LEAK	375907	07263	FD7222	REF		
CR8	DIODE, ZENER, 24.0V +/-5%	267807	04713	1N9708	6	2	
CR9	DIODE, ZENER, 24.0V +/-5%	267807	04713	1N9708	REF		
CR10	DIODE, ZENER, 24.0V +/-5%	267807	04713	1N9708	REF		
CR11	DIODE, ZENER, 24.0V +/-5%	267807	04713	1N9708	REF		
CR12	DIODE, ZENER, 24.0V +/-5%	267807	04713	1N9708	REF		
CR13	DIODE, ZENER, 24.0V +/-5%	267807	04713	1N9708	REF		
H1	WASHER, CRESCENT SPRING	544239	89536	544239	6		
J1	CONNECTOR, RF, RECEPTACLE	512087	16733	705147-001	1		
J2	CONNECTOR, CON HEX R.A.	512855	74970	142-0299-006	1		
K1	RELAY, ARMATURE	528638	11532	712-26	6	2	2
K2	RELAY, ARMATURE	528638	11532	712-26	REF		2
K3	RELAY, ARMATURE	528638	11532	712-26	REF		2
K4	RELAY, ARMATURE	528638	11532	712-26	REF		2
K5	RELAY, ARMATURE	528638	11532	712-26	REF		2
K6	RELAY, ARMATURE	528638	11532	712-26	REF		2
L1	CHOKE, 6-TURN	320911	89536	320911	12		
L2	CHOKE, 6-TURN	320911	89536	320911	REF		
L3	CHOKE, 6-TURN	320911	89536	320911	REF		
L4	CHOKE, 6-TURN	320911	89536	320911	REF		
L5	CHOKE, 6-TURN	320911	89536	320911	REF		
L6	CHOKE, 6-TURN	320911	89536	320911	REF		
L8	CHOKE, 6-TURN	320911	89536	320911	REF		

Table 6-20. A4A3 Attenuator PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
L9	CHOKE, 6-TURN	320911	89536	320911	REF		
L10	CHOKE, 6-TURN	320911	89536	320911	REF		
L11	CHOKE, 6-TURN	320911	89536	320911	REF		
L12	CHOKE, 6-TURN	320911	89536	320911	REF		
L13	CHOKE, 6-TURN	320911	89536	320911	REF		
MP1	AIDE, PCB PULL (NOT SHOWN)	541730	89536	541730	3		
MP2	CONNECTOR COVERS (W/J1, J2)	488445	89536	488445	2		
MP3	TAB, COPPER (W/K1 - K6)	541672	89536	541672	6		
P1	CONNECTOR, RECEPTACLE	544056	89536	544056	7		
Q1	TRANSISTOR, SI, NPN	218081	04713	MPS6520	1	1	
Q3	TRANSISTOR, SI, PNP	418707	04713	MPS56562	6	2	
Q4	TRANSISTOR, SI, PNP	418707	04713	MPS56562	REF		
Q5	TRANSISTOR, SI, PNP	418707	04713	MPS56562	REF		
Q6	TRANSISTOR, SI, PNP	418707	04713	MPS56562	REF		
Q7	TRANSISTOR, SI, PNP	418707	04713	MPS56562	REF		
Q8	TRANSISTOR, SI, PNP	418707	04713	MPS56562	REF		
R1	RES, DEP. CAR, 7.5K +/-5%, 1/4W	441667	80031	CR251-4-5P7K5	6		
R2	RES, DEP. CAR, 7.5K +/-5%, 1/4W	441667	80031	CR251-4-5P7K5	REF		
R3	RES, DEP. CAR, 7.5K +/-5%, 1/4W	441667	80031	CR251-4-5P7K5	REF		
R4	RES, DEP. CAR, 7.5K +/-5%, 1/4W	441667	80031	CR251-4-5P7K5	REF		
R5	RES, DEP. CAR, 7.5K +/-5%, 1/4W	441667	80031	CR251-4-5P7K5	REF		
R6	RES, DEP. CAR, 7.5K +/-5%, 1/4W	441667	80031	CR251-4-5P7K5	REF		
R8	RES, DEP. CAR, 680 +/-5%, 1/4W	368779	80031	CR251-4-5P680E	6		
R9	RES, DEP. CAR, 680 +/-5%, 1/4W	368779	80031	CR251-4-5P680E	REF		
R10	RES, DEP. CAR, 680 +/-5%, 1/4W	368779	80031	CR251-4-5P680E	REF		
R11	RES, DEP. CAR, 680 +/-5%, 1/4W	368779	80031	CR251-4-5P680E	REF		
R12	RES, DEP. CAR, 680 +/-5%, 1/4W	368779	80031	CR251-4-5P680E	REF		
R13	RES, DEP. CAR, 680 +/-5%, 1/4W	368779	80031	CR251-4-5P680E	REF		
R15	RES, DEP. CAR, 510, +/-5%, 1/4W	441600	80031	CR251-4-5P510E	6		
R16	RES, DEP. CAR, 510, +/-5%, 1/4W	441600	80031	CR251-4-5P510E	REF		
R17	RES, DEP. CAR, 510, +/-5%, 1/4W	441600	80031	CR251-4-5P510E	REF		
R18	RES, DEP. CAR, 510, +/-5%, 1/4W	441600	80031	CR251-4-5P510E	REF		
R19	RES, DEP. CAR, 510, +/-5%, 1/4W	441600	80031	CR251-4-5P510E	REF		
R20	RES, DEP. CAR, 510, +/-5%, 1/4W	441600	80031	CR251-4-5P510E	REF		
R22	RES, MTL. FILM, 37.4 +/-0.1%, 1/8W	461079	89536	461079	1		2
R23	RES, MTL. FILM, 150.0 +/-0.1%, 1/8W	461624	89536	461624	2		2
R24	RES, MTL. FILM, 150.0 +/-0.1%, 1/8W	461624	89536	461624	REF		2
R25	RES, MTL. FILM, 94.2 +/-0.1%, 1/8W	461616	89536	461616	1		2
R26	RES, MTL. FILM, 83.5 +/-0.1%, 1/8W	461608	89536	461608	2		2
R27	RES, MTL. FILM, 83.5 +/-0.1%, 1/8W	461608	89536	461608	REF		2
R28	RES, MTL. FILM, 402.0 +/-0.1%, 1/8W	461632	89536	461362	4		2
R29	RES, MTL. FILM, 56.9 +/-0.1%, 1/8W	461590	89536	461590	8		2
R30	RES, MTL. FILM, 56.9 +/-0.1%, 1/8W	461590	89536	461590	REF		2
R31	RES, MTL. FILM, 402.0 +/-0.1%, 1/8W	461632	89536	461362	REF		2
R32	RES, MTL. FILM, 56.9 +/-0.1%, 1/8W	461590	89536	461590	REF		2
R33	RES, MTL. FILM, 56.9 +/-0.1%, 1/8W	461590	89536	461590	REF		2
R34	RES, MTL. FILM, 402.0 +/-0.1%, 1/8W	461632	89536	461362	REF		2
R35	RES, MTL. FILM, 56.9 +/-0.1%, 1/8W	461590	89536	461590	REF		2
R36	RES, MTL. FILM, 56.9 +/-0.1%, 1/8W	461590	89536	461590	REF		2
R37	RES, MTL. FILM, 402.0 +/-0.1%, 1/8W	461632	89536	461362	REF		2

Table 6-20. A4A3 Attenuator PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
R38	RES, MTL. FILM, 56.9 +/-0.1%, 1/8W	461590	89536	461590	REF		2
R39	RES, MTL. FILM, 56.9 +/-0.1%, 1/8W	461590	89536	461590	REF		2
U2	IC, 5 TRANSISTOR ARRAY	380188	02735	CA3183E	1	1	
U3	RESISTOR NETWORK, 1K	407445	89536	407445	1	1	
U4	RESISTOR NETWORK, 10K	364000	89536	364000	1	1	

1 BEFORE ORDERING SPARE PARTS OR SPARE PCB ASSEMBLIES, PLEASE CONTACT YOUR NEAREST JOHN FLUKE SERVICE CENTER FOR INFORMATION.

2 IF THESE COMPONENTS FAIL, THE USER IS URGED TO RETURN THE GENERATOR TO THE NEAREST JOHN FLUKE SERVICE CENTER.

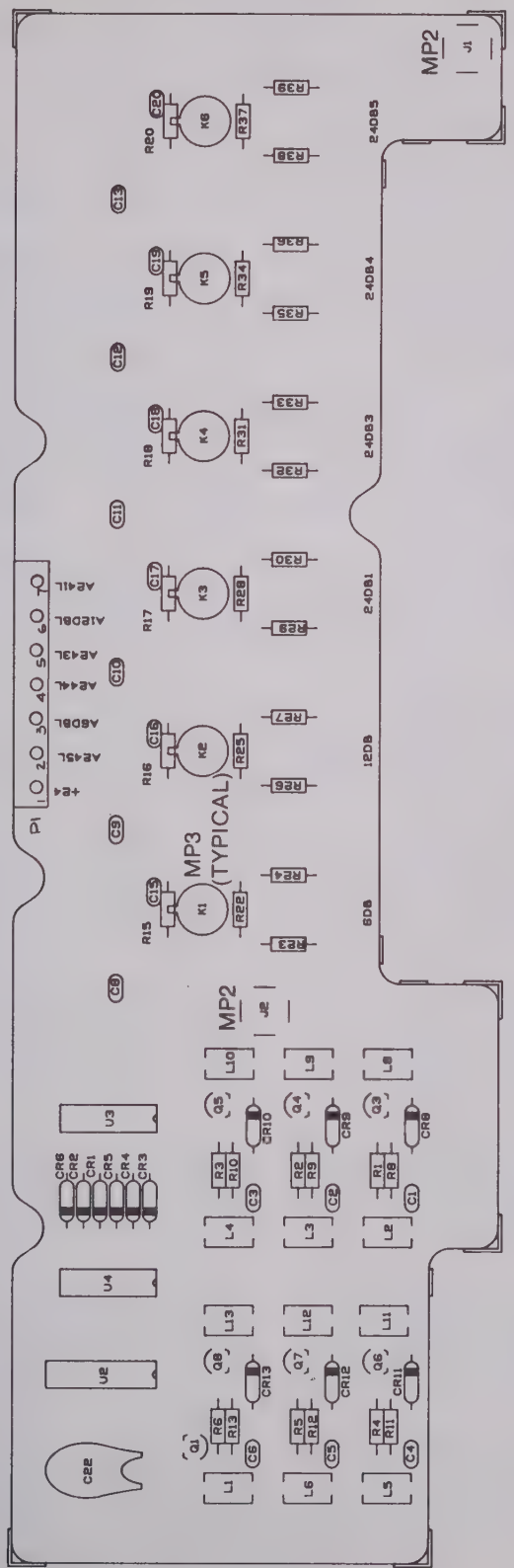


Figure 6-20. A4A3 Attenuator PCB Assembly

Table 6-21. A4A4 Modulator Divider PCB Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
A4A4Ø	MODULATOR DIVIDER PCB ASSEMBLY FIGURE 6-21 (6070A-4016T)	463596	89536	463596	REF		
C1	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	14		
C2	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	25		
C3	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C4	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C5	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C6	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C7	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C8	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C9	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C10	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C11	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C12	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C14	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C15	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C16	CAP, CER, 47 PF +/-2%, 100V	512368	89536	512368	7		
C17	CAP, CER, 47 PF +/-2%, 100V	512368	89536	512368	REF		
C18	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C19	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C20	CAP, CER, 100 PF +/-2%, 100V	512848	89536	512848	6		
C21	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C22	CAP, CER, 0.01 UF +/-20%, 100V	407361	72982	8121-A100-W5R-103M	6		
C23	CAP, CER, 0.01 UF +/-20%, 100V	407361	72982	8121-A100-W5R-103M	REF		
C24	CAP, CER, 0.01 UF +/-20%, 100V	407361	72982	8121-A100-W5R-103M	REF		
C25	CAP, CER, 0.01 UF +/-20%, 100V	407361	72982	8121-A100-W5R-103M	REF		
C26	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C27	CAP, CER, 47 PF +/-2%, 100V	512368	89536	512368	REF		
C28	CAP, CER, 0.047 UF +/-20%, 50V	460733	71590	CW20C473M	7		
C29	CAP, CER, 0.047 UF +/-20%, 50V	460733	71590	CW20C473M	REF		
C30	CAP, CER, 0.047 UF +/-20%, 50V	460733	71590	CW20C473M	REF		
C31	CAP, CER, 47 PF +/-2%, 100V	512368	89536	512368	REF		
C32	CAP, CER, 100 PF +/-2%, 100V	512848	89536	512848	REF		
C33	CAP, CER, 0.047 UF +/-20%, 50V	460733	71590	CW20C473M	REF		
C34	CAP, CER, 100 PF +/-2%, 100V	512848	89536	512848	REF		
C35	CAP, CER, 0.047 UF +/-20%, 50V	460733	71590	CW20C473M	REF		
C36	CAP, CER, 100 PF +/-2%, 100V	512848	89536	512848	REF		
C37	CAP, CER, 0.01 UF +/-20%, 100V	407361	72982	8121-A100-W5R-103M	REF		
C38	CAP, CER, 0.01 UF +/-20%, 100V	407361	72982	8121-A100-W5R-103M	REF		
C39	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C40	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C41	CAP, CER, 100 PF +/-2%, 100V	512848	89536	512848	REF		
C42	CAP, CER, 0.047 UF +/-20%, 50V	460733	71590	CW20C473M	REF		
C43	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C44	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C45	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C46	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C47	CAP, CER, 100 PF +/-2%, 100V	512848	89536	512848	REF		
C48	CAP, CER, 0.047 UF +/-20%, 50V	460733	71590	CW20C473M	REF		

Table 6-21. A4A4 Modulator Divider PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
C49	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C50	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C51	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C52	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C53	CAP, CER, 12 PF +/-2%, 100V	376871	89536	376871	1		
C54	CAP, CER, 6.8 PF +/-0.25PF, 100V	512327	89536	512327	1		
C55	CAP, CER, 15 PF +/-2%, 100V	369074	89536	369074	1		
C56	CAP, CER, 18 PF +/-2%, 100V	512335	89536	512335	4		
C57	CAP, CER, 18 PF +/-2%, 100V	512335	89536	512335	REF		
C58	CAP, CER, 18 PF +/-2%, 100V	512335	89536	512335	REF		
C59	CAP, CER, 10 PF +/-2%, 100V	512343	89536	512343	2		
C60	CAP, CER, 22 PF +/-2%, 100V	512871	89536	512871	1		
C61	CAP, CER, 27 PF +/-2%, 100V	362749	89536	362749	5		
C62	CAP, CER, 27 PF +/-2%, 100V	362749	89536	362749	REF		
C63	CAP, CER, 18 PF +/-2%, 100V	512335	89536	512335	REF		
C64	CAP, CER, 10 PF +/-2%, 100V	512343	89536	512343	REF		
C65	CAP, CER, 27 PF +/-2%, 100V	362749	89536	362749	REF		
C66	CAP, CER, 27 PF +/-2%, 100V	362749	89536	362749	REF		
C67	CAP, CER, 27 PF +/-2%, 100V	362749	89536	362749	REF		
C68	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C69	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C70	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	5		
C71	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C72	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	REF		
C73	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	REF		
C74	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	REF		
C75	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C76	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C77	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C78	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C79	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C80	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C81	CAP, CER, 68 PF +/-2%, 100V	362756	89536	362756	1		
C82	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	REF		
C83	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C84	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C85	CAP, CER, 47 PF +/-2%, 100V	512368	89536	512368	REF		
C86	CAP, CER, 47 PF +/-2%, 100V	512368	89536	512368	REF		
C87	CAP, CER, 47 PF +/-2%, 100V	512368	89536	512368	REF		
CR1	DIODE, HI-SPEED SWITCHING	203323	04713	1N4448	7	2	
CR2	DIODE, HI-SPEED SWITCHING	203323	04713	1N4448	REF		
CR3	DIODE, HI-SPEED SWITCHING	203323	04713	1N4448	REF		
CR4	DIODE, HI-SPEED SWITCHING	203323	04713	1N4448	REF		
CR5	DIODE, HI-SPEED SWITCHING	203323	04713	1N4448	REF		
CR6	DIODE, SMALL SIGNAL	402776	28480	HP3379	16	4	
CR7	DIODE, SMALL SIGNAL	402776	28480	HP3379	REF		
CR8	DIODE, SMALL SIGNAL	402776	28480	HP3379	REF		
CR9	DIODE, SMALL SIGNAL	402776	28480	HP3379	REF		
CR10	DIODE, SMALL SIGNAL	402776	28480	HP3379	REF		
CR11	DIODE, SMALL SIGNAL	402776	28480	HP3379	REF		

Table 6-21. A4A4 Modulator Divider PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
CR12	DIODE, SMALL SIGNAL	402776	28480	HP3379	REF		
CR13	DIODE, SMALL SIGNAL	402776	28480	HP3379	REF		
CR14	DIODE, SMALL SIGNAL	402776	28480	HP3379	REF		
CR15	DIODE, SMALL SIGNAL	402776	28480	HP3379	REF		
CR16	DIODE, ZENER	454595	12969	UZ8706	1		
CR17	DIODE, SMALL SIGNAL	402776	28480	HP3379	REF		
CR18	DIODE, SMALL SIGNAL	402776	28480	HP3379	REF		
CR19	DIODE, SMALL SIGNAL	402776	28480	HP3379	REF		
CR20	DIODE, SMALL SIGNAL	402776	28480	HP3379	REF		
CR21	DIODE, HI-SPEED SWITCHING	203323	04713	1N4448	REF		
CR22	DIODE, HI-SPEED SWITCHING	203323	04713	1N4448	REF		
CR23	DIODE, SMALL SIGNAL	402776	28480	HP3379	REF		
CR24	DIODE, SMALL SIGNAL	402776	28480	HP3379	REF		
CR25	DIODE, SI, SWITCHING	535138	04713	MPN3401	1	1	
CR26	DIODE, ZENER, 9.1V +/-5%	369587	04713	1N757A	1	1	
J1	CONNECTOR, RF, SMB	512095	16733	702033	3		
J2	CONNECTOR, RF, SMB	512095	16733	702033	REF		
J3	CONNECTOR, RF, SMB	512095	16733	702033	REF		
L1	CHOKE, 6-TURN	320911	89536	320911	14		
L3	INDUCTOR, 0.33 UH	261743	24759	MR0.33	3		
L4	CHOKE, 6-TURN	320911	89536	320911	REF		
L5	INDUCTOR, 0.10 UH	257154	24759	MR-0.10	2		
L6	INDUCTOR, 0.10 UH	257154	24759	MR-0.10	REF		
L7	INDUCTOR, 0.33 UH	261743	24759	MR0.33	REF		
L8	INDUCTOR, 0.33 UH	261743	24759	MR0.33	REF		
L9	CHOKE, 6-TURN	320911	89536	320911	REF		
L10	CHOKE, 6-TURN	320911	89536	320911	REF		
L11	CHOKE, RF, 150 UH +/-5%	174763	72259	WEE-150	1		
L12	CHOKE, 6-TURN	320911	89536	320911	REF		
L13	CHOKE, 6-TURN	320911	89536	320911	REF		
L14	CHOKE, 6-TURN	320911	89536	320911	REF		
L15	CHOKE, 6-TURN	320911	89536	320911	REF		
L16	CHOKE, 6-TURN	320911	89536	320911	REF		
L17	CHOKE, 6-TURN	320911	89536	320911	REF		
L18	CHOKE, 6-TURN	320911	89536	320911	REF		
L19	CHOKE, 6-TURN	320911	89536	320911	REF		
L20	CHOKE, 6-TURN	320911	89536	320911	REF		
L21	CHOKE, 6-TURN	320911	89536	320911	REF		
MP1	AIDE, PCB PULL	541730	89536	541730	3		
MP3	SHIELD, BOTTOM, MODULE DIVIDER	515916	89536	515916	1		
MP4	SHIELD, TOP, MODULE, DIVIDER	515882	89536	515882	1		
MP5	SHIELD, RF CONNECTOR (W/J1-J3)	488455	89536	488455	3		
MP6	SOCKET, COMPONENT LEAD (NOT SHOWN)	343285	00779	2-331272-6	14		
MP7	SOCKET, COMPONENT LEAD (NOT SHOWN)	376418	22526	75060-007	142		
MP8	CONNECTOR, RECEPTACLE	544056	00779	50871-1	11		
Q1	TRANSISTOR, SI, PNP	352369	12040	2N4403	3	1	
Q2Ⓐ	TRANSISTOR, D-MOS	507905	18324	507905	2	1	
Q3Ⓐ	TRANSISTOR, D-MOS	507905	18324	507905	REF		
Q4	TRANSISTOR, SI, NPN	218396	04713	2N3904	1	1	
Q5	TRANSISTOR, SI, PNP	352369	12040	2N4403	REF		

Table 6-21. A4A4 Modulator Divider PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
Q6	TRANSISTOR, SI, PNP	352369	12040	2N4403	REF		
Q7⊗	TRANSISTOR, D-MOS, FIELD EFFECT	507921	18324	SD211DE	1	1	
R1	RES, DEP. CAR, 100 +/-5%, 1/4W	348771	80031	CR251-4-5P100E	1		
R2	RES, DEP. CAR, 680 +/-5%, 1/4W	368779	80031	CR251-4-5P680E	1		
R3	RES, DEP. CAR. (SELECTED)				7		1
R4	RES, DEP. CAR. (SELECTED)				REF		
R5	RES, DEP. CAR. (SELECTED)				REF		
R6	RES, DEP. CAR. (SELECTED)				REF		
R7	RES, DEP. CAR. (SELECTED)				REF		
R8	RES, DEP. CAR. (SELECTED)				REF		
R9	RES, DEP. CAR. (SELECTED)				REF		
R10	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	7		
R11	RES, DEP. CAR, 6.2K +/-5%, 1/4W	442368	80031	CR251-4-5P6K2	1		
R12	RES, DEP. CAR, 300 +/-5%, 1/4W	441519	80031	CR251-4-5P300E	2		
R13	RES, DEP. CAR, 2.7K +/-5%, 1/4W	386490	80031	CR251-4-5P2K7	2		
R14	RES, COMP, 1K +/-10%, 1/8W	153916	01121	BB1021	1		
R15	RES, DEP. CAR, 2K +/-5%, 1/4W	441469	80031	CR251-4-5P2K	4		
R16	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	6		
R17	RES, DEP. CAR, 2K +/-5%, 1/4W	441469	80031	CR251-4-5P2K	REF		
R18	RES, MTL. FILM, 3.65K +/-1%, 1/8W	293779	91637	CMF553651F	1		
R19	RES, MTL. FILM, 1.40K +/-5%, 1/8W	344333	91637	CMF551401F	1		
R20	RES, COMP, 150 +/-5%, 1/8W	153924	01121	BB1515	1		
R21	RES, DEP. CAR, 2K +/-5%, 1/4W	441469	80031	CR251-4-5P2K	REF		
R22	RES, COMP, 180 +/-5%, 1/8W	512756	01121	BB1815	2		
R23	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R24	RES, VAR, 100K +/-10%, 1/2W	369520	11236	360T-104A	7		2
R25	RES, DEP. CAR, 82K +/-5%, 1/4W	348912	80031	CR251-4-5P82K	1		
R26	RES, VAR, 100K +/-10%, 1/2W	369520	11236	360T-104A	REF		2
R27	RES, DEP. CAR, 330K +/-5%, 1/4W	376640	80031	CR251-4-5P330K	6		
R28	RES, VAR, 100K +/-10%, 1/2W	369520	11236	360T-104A	REF		2
R29	RES, DEP. CAR, 330K +/-5%, 1/4W	376640	80031	CR251-4-5P330K	REF		
R30	RES, VAR, 100K +/-10%, 1/2W	369520	11236	360T-104A	REF		2
R31	RES, DEP. CAR, 330K +/-5%, 1/4W	376640	80031	CR251-4-5P330K	REF		
R32	RES, VAR, 100K +/-10%, 1/2W	369520	11236	360T-104A	REF		2
R33	RES, DEP. CAR, 330K +/-5%, 1/4W	376640	80031	CR251-4-5P330K	REF		
R34	RES, DEP. CAR, 510 +/-5%, 1/4W	441600	80031	CR251-4-5P510E	4		
R35	RES, DEP. CAR, 510 +/-5%, 1/4W	441600	80031	CR251-4-5P510E	REF		
R36	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R37	RES, DEP. CAR, 51 +/-5%, 1/4W	414540	80031	CR251-4-5P51E	2		
R38	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R39	RES, VAR, 100K +/-10%, 1/2W	369520	11236	360T-104A	REF		2
R40	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R41	RES, DEP. CAR, 12K +/-5%, 1/4W	348847	80031	CR251-4-5P12K	2		
R42	RES, DEP. CAR, 330K +/-5%, 1/4W	376640	80031	CR251-4-5P330K	REF		
R43	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R44	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R45	RES, DEP. CAR, 510 +/-5%, 1/4W	441600	80031	CR251-4-5P510E	REF		
R46	RES, DEP. CAR, 510 +/-5%, 1/4W	441600	80031	CR251-4-5P510E	REF		
R47	RES, VAR, 100K +/-10%, 1/2W	369520	11236	360T-104A	REF		2
R48	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		

Table 6-21. A4A4 Modulator Divider PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
R49	RES, DEP. CAR, 12K +/-5%, 1/4W	348847	80031	CR251-4-5P12K	REF		
R50	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R51	RES, DEP. CAR, 51 +/-5%, 1/4W	414540	80031	CR251-4-5P51E	REF		
R52	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R53	RES, DEP. CAR, 330K +/-5%, 1/4W	376640	80031	CR251-4-5P330K	REF		
R54	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R55	RES, DEP. CAR, 220K +/-5%, 1/4W	348953	80031	CR251-4-5P220K	6		
R56	RES, DEP. CAR, 220K +/-5%, 1/4W	348953	80031	CR251-4-5P220K	REF		
R57	RES, DEP. CAR, 220K +/-5%, 1/4W	348953	80031	CR251-4-5P220K	REF		
R58	RES, DEP. CAR, 220K +/-5%, 1/4W	348953	80031	CR251-4-5P220K	REF		
R59	RES, DEP. CAR, 470 +/-5%, 1/4W	343434	80031	CR251-4-5P470E	1		
R60	RES, DEP. CAR, 220K +/-5%, 1/4W	348953	80031	CR251-4-5P220K	REF		
R61	RES, DEP. CAR, 220K +/-5%, 1/4W	348953	80031	CR251-4-5P220K	REF		
R62	RES, COMP, 100 +/-5%, 1/2W	188508	01121	EB1015	2		
R63	RES, DEP. CAR, 22K +/-5%, 1/4W	348870	80031	CR251-4-5P22K	1		
R64	RES, DEP. CAR, 2K +/-5%, 1/4W	441469	80031	CR251-4-5P2K	REF		
R65	RES, DEP. CAR, 20K +/-5%, 1/4W	441477	80031	CR251-4-5P20K	1		
R66	RES, COMP, 100 +/-5%, 1/2W	188508	01121	EB1015	REF		
R67	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R68	RES, DEP. CAR, 3.6K +/-5%, 1/4W	442343	80031	CR251-4-5P3K6	1		
R69	RES, COMP, 10 +/-10%, 1/2W	108092	01121	EB1001	1		
R70	RES, COMP, 470 +/-5%, 1/2W	108787	01121	EB4715	1		
R71	RES, DEP. CAR, 2.7K +/-5%, 1/4W	386490	80031	CR251-4-5P2K7	REF		
R72	RES, DEP. CAR, 300 +/-5%, 1/4W	441519	80031	CR251-4-5P300E	REF		
R73	RES, DEP. CAR, 1M +/-5%, 1/4W	348987	80031	CR251-4-5P1M	1		
R74	RES, DEP. CAR, 100K +/-5%, 1/4W	348920	80031	CR251-4-5P100K	1		
R75	RES, COMP, 4.7K +/-5%, 1/4W	348821	01121	CB4725	3		
R76	RES, COMP, 4.7K +/-5%, 1/4W	348821	01121	CB4725	REF		
R77	RES, DEP. CAR, 27K +/-5%, 1/4W	441501	80031	CR251-4-5P27K	1		
R78	RES, COMP, 100 +/-10%, 1/8W	261826	01121	BB1011	1		
R79	RES, COMP, 120 +/-5%, 1/8W	513978	01121	BB1215	1		
R80	RES, DEP. CAR, 10 +/-5%, 1/4W	340075	80031	CR251-4-5P10E	1		
R81	RES, DEP. CAR, 160 +/-5%, 1/4W	441410	80031	CR251-4-5P160E	1		
R82	RES, COMP, 200 +/-5%, 1/2W	169839	01121	EB2015	2		
R83	RES, COMP, 4.7K +/-5%, 1/4W	348821	01121	CB4725	REF		
R84	RES, COMP, 200 +/-5%, 1/2W	169839	01121	EB2015	REF		
R85	RES, COMP, 6.8 +/-5%, 1/8W	528349	01121	BB6R85	2		
R86	RES, COMP, 6.8 +/-5%, 1/8W	528349	01121	BB6R85	REF		
R87	RES, COMP, 180 +/-5%, 1/8W	512756	01121	BB1815	REF		
R88	RES, VAR, 1K +/-10%, 1/2W	275750	11236	360T-102A	1		2
TP1	TEST POINT	512889	00779	62395-1	3		
TP2	TEST POINT	512889	00779	62395-1	REF		
TP3	TEST POINT	512889	00779	62395-1	REF		
U1	IC, HYBRID, 8DB POWER AMP	492801	89536	492801	1	1	
U2Ø	IC, 8-CHANNEL MULTIPLEX SWITCH W/DECODE	507897	17856	S13705-193K	1	1	
U3	IC, TTL, QUAD, 2-INPUT NOR GATE	393041	01295	SN74LS02N	1	1	
U4	IC, HYBRID, MODULATOR	492769	89536	492769	5	1	
U5Ø	IC, HYBRID, MODULATOR	492769	89536	492769	REF		
U6	IC, LINEAR, LO-NOISE, DUAL OP-AMP	504720	18324	NE5532FE	3	1	
U7	IC, LINEAR, LO-NOISE, DUAL OP-AMP	504720	18324	NE5532FE	REF		

Table 6-21. A4A4 Modulator Divider PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
U8	IC, LINEAR, LO-NOISE, DUAL OP-AMP	504720	18324	NE5532FE	REF		
U9⊗	IC, LINEAR OP-AMP	495051	18324	NE5534N	1	1	
U10	IC, HYBRID, MODULATOR	492769	89536	492769	REF		
U11	IC, HYBRID, LIMITER AMP	492728	89536	492728	2	1	
U12⊗	IC, HYBRID, MODULATOR	492769	89536	492769	REF		
U13	IC, HYBRID, LIMITER AMP	492728	89536	492728	REF		
U14	IC, ECL, 750 MHZ, D TYPE, M/S, F/F	404574	89536	404574	2	1	
U15	IC, ECL, 750 MHZ, D TYPE, M/S, F/F	404574	89536	404574	REF		
U16	IC, BCD-TO-DECIMAL DECODER DRIVER	419192	01295	SN74LS145N	1	1	
U17	RESISTOR NETWORK	512913	89536	512913	1	1	
U18⊗	IC, HYBRID, MODULATOR	492769	89536	492769	REF		
W1	CABLE ASSEMBLY, SEMI-RIGID	530766	89536	530766	1		
W48	CABLE ASSEMBLY, SEMI-RIGID	524975	89536	524975	1		
XQ1	SOCKET, TRANSISTOR	285262	71785	1-33-23-92-045	3		
XQ5	SOCKET, TRANSISTOR	285262	71785	1-33-23-92-045	REF		
XQ6	SOCKET, TRANSISTOR	285262	71785	1-33-23-92-045	REF		
XU2	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	2		
XU3	SOCKET, IC, 14-PIN	370304	12040	MM74C906N	1		
XU6	SOCKET, IC, 8-PIN	478012	91506	308-AG39D	4		
XU7	SOCKET, IC, 8-PIN	478012	91506	308-AG39D	REF		
XU8	SOCKET, IC, 8-PIN	478012	91506	308-AG39D	REF		
XU9	SOCKET, IC, 8-PIN	478012	91506	308-AG39D	REF		
XU16	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		

1 RESISTORS R3 THRU R9 ARE SELECTED RESISTORS IN TEST DEPT. CALL YOUR SERVICE LAB FOR REORDER INSTRUCTIONS.

2 IF THESE COMPONENTS FAIL THE USER IS URGED TO RETURN THE GENERATOR TO THE NEAREST JOHN FLUKE SERVICE CENTER.

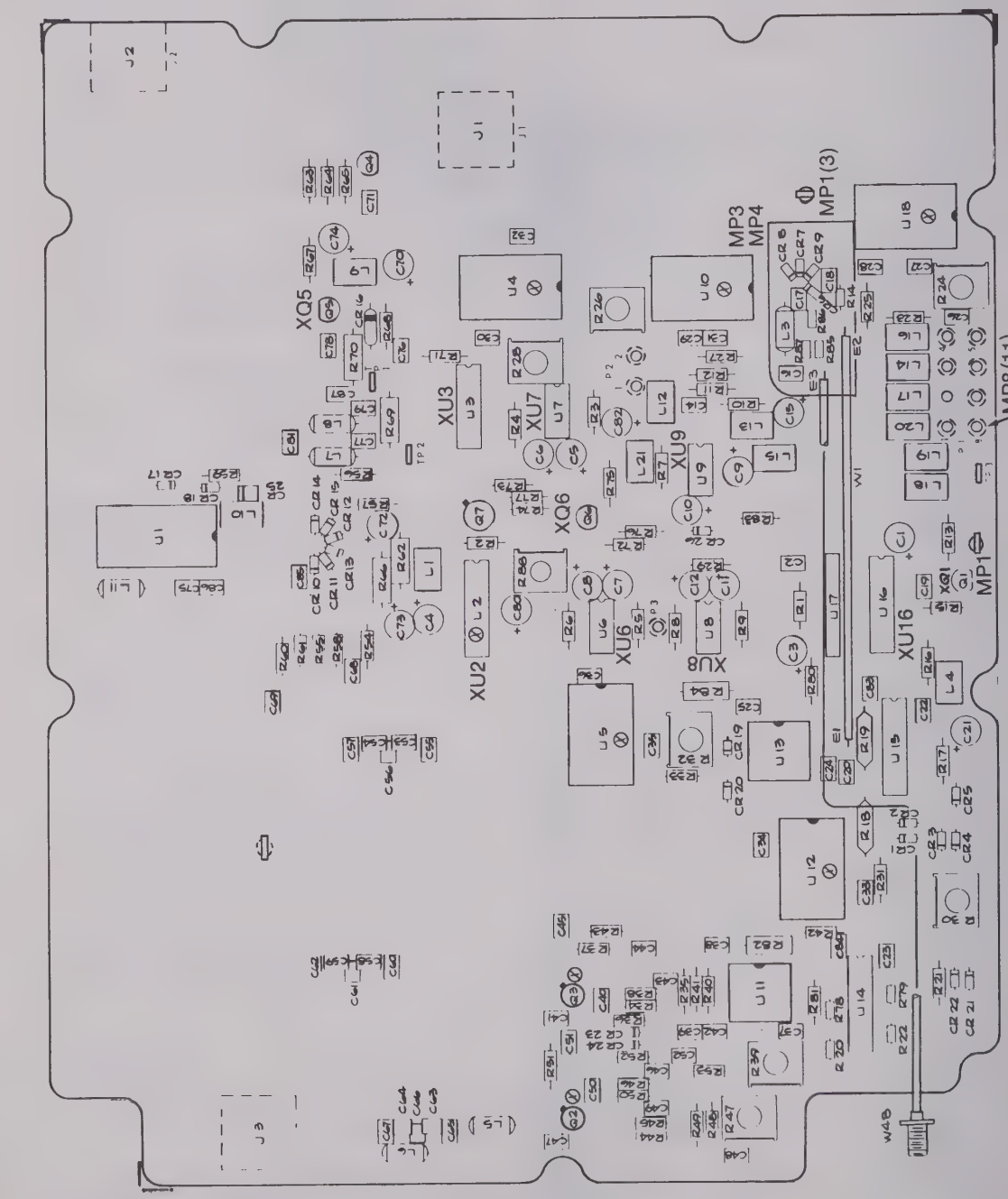


Figure 6-21. A4A4 Modulator Divider PCB Assembly

Table 6-22. A4A6 X2 Output Amplifier PCB Assembly (6071A)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
A4A6⊗	X2 OUTPUT AMPLIFIER PCB ASSEMBLY FIGURE 6-22 (6071A-4017T) (USED ON 6071A ONLY)	546465	89536	546465	REF		1
C1	CAP, TA, 2.2 UF +/-20%, 35V	485185	56289	196225X0035KA1	4		
C2	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	12		
C3	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	23		
C5	CAP, CER, 0.005 UF +/-20%, 50V	255471	51642	200-050-601-502M	1		
C7	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	REF		
C8	CAP, CER, 47 PF +/-2%, 100V	512368	89536	512368	15		
C9	CAP, CER, 47 PF +/-2%, 100V	512368	89536	512368	REF		
C10	CAP, CER, 47 PF +/-2%, 100V	512368	89536	512368	REF		
C11	CAP, CER, 47 PF +/-2%, 100V	512368	89536	512368	REF		
C12	CAP, CER, 47 PF +/-2%, 100V	512368	89536	512368	REF		
C13	CAP, CER, 47 PF +/-2%, 100V	512368	89536	512368	REF		
C14	CAP, CER, 33 PF +/-2%, 100V	513226	89536	513226	2		
C15	CAP, TA, 2.2 UF +/-20%, 35V	485185	56289	196225X0035KA1	REF		
C16	CAP, CER, 33 PF +/-2%, 100V	513226	89536	513226	REF		
C17	CAP, CER, 220 PF +/-5%, 100V	512111	89536	512111	1		
C19	CAP, CER, 47 PF +/-2%, 100V	512368	89536	512368	REF		
C20	CAP, CER, 47 PF +/-2%, 100V	512368	89536	512368	REF		
C22	CAP, CER, 0.01 UF +/-20%, 100V	407361	72982	8121-A100-W5R-103M	2		
C23	CAP, CER, 0.01 UF +/-20%, 100V	407361	72982	8121-A100-W5R-103M	REF		
C24	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C25	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C26	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C27	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW3C0C224K	6		
C28	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW3C0C224K	REF		
C29	CAP, CER, 47 PF +/-2%, 100V	512368	89536	512368	REF		
C30	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C31	CAP, CER, 0.01 UF +/-20%, 100V	407361	72982	8121-A100-W5R-103M	5		
C33	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C34	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C35	CAP, CER, 3.9 PF +/-0.25%, 100V	512947	89536	512947	1		
C36	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C37	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C38	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C39	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW3C0C224K	REF		
C40	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW3C0C224K	REF		
C42	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C43	CAP, CER, 0.033 UF +/-20%, 50V	543074	72982	8121-050-W5R33NFM	1		
C45	CAP, CER, 47 PF +/-2%, 100V	512368	89536	512368	REF		
C46	CAP, CER, 2.7 PF +/-0.25%, 100V	363705	89536	363705	1		
C47	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	REF		
C48	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	REF		
C49	CAP, TA, 2.2 UF +/-20%, 35V	485185	56289	196225X0035KA1	REF		
C50	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C51	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C52	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C55	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	REF		

Table 6-22. A4A6 X2 Output Amplifier PCB Assembly (6071A) (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
C56	CAP, TA, 22 UF +/-20%, 15V	423012	56289	196D226X0015KA1	2		
C57	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	REF		
C58	CAP, TA, 22 UF +/-20%, 15V	423012	56289	196D226X0015KA1	REF		
C59	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	1		
C60	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	REF		
C61	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C62	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C63	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C64	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C65	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C66	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C67	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C68	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C69	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C70	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	REF		
C71	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	REF		
C72	CAP, CER, 100 PF +/-2%, 100V	512848	89536	512848	1		
C74	CAP, CER, 560 PF +/-5%, 50V	528505	89536	528505	2		
C75	CAP, CER, 0.01 UF +/-20%, 100V	407361	72982	8121-A100-W5R-103M	REF		
C76	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW3C0C224K	REF		
C77	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	REF		
C78	CAP, CER, 0.01 UF +/-20%, 100V	407361	72982	8121-A100-W5R-103M	REF		
C79	CAP, CER, 560 PF +/-5%, 50V	528505	89536	528505	REF		
C80	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	REF		
C81	CAP, CER, 0.01 UF +/-20%, 100V	407361	72982	8121-A100-W5R-103M	REF		
C82	CAP, TA, 2.2 UF +/-20%, 35V	485185	56289	196225X0035KA1	REF		
C83	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	REF		
C84	CAP, CER, 1800 PF +/-5%, 50V	528547	89536	528547	1		
C85	CAP, CER, 430 PF +/-5%, 50V	528489	89536	528489	1		
C86	CAP, CER, 820 PF +/-...., 100V	528604	89536	528604	1		
C87	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW3C0C224K	REF		
C88	CAP, CER, 47 PF +/-2%, 100V	512368	89536	512368	REF		
C89	CAP, CER, 1.5 PF 100V	529909	89536	529909	2		
C90	CAP, CER, 0.01 UF +/-20%, 100V	407361	72982	8121-A100-W5R-103M	REF		
C92	CAP, CER, 1.5 PF 100V	529909	89536	529909	REF		
C93	CAP, CER, 1.8 PF +/-0.25%, 100V	512897	89536	512897	1		
C94	CAP, CER, 5.6 PF +/-0.25%, 100V	512954	89536	512954	1		
C95	CAP, CER, 47 PF +/-2%, 100V	512368	89536	512368	REF		
C96	CAP, CER, 47 PF +/-2%, 100V	512368	89536	512368	REF		
C97	CAP, CER, 47 PF +/-2%, 100V	512368	89536	512368	REF		
C98	CAP, CER, 47 PF +/-2%, 100V	512368	89536	512368	REF		
CR1	DIODE, LO-CAP, LO-LEAK	375907	07263	FD7222	1	1	
CR2	DIODE, ZENER	267807	04713	1N9708	4	1	
CR3	DIODE, ZENER	267807	04713	1N9708	REF		
CR4	DIODE, ZENER	159798	04713	1N751A	2	1	
CR5	DIODE, ZENER	246611	04713	1N961B	2	1	
CR6	DIODE, SCHOTTKY BARRIER	535195	28480	5082-2800	5	1	
CR7	DIODE, HI-SPEED SWITCHING	203323	04713	1N4448	1	1	
CR8	DIODE, 2-PELLET	375477	09214	MPD-200	1	1	
CR9	DIODE, ZENER	309799	04713	1N746	1	1	

Table 6-22. A4A6 X2 Output Amplifier PCB Assembly (6071A) (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
CR10	DIODE, ZENER	180497	04713	1N753	1	1	
CR11	DIODE, SCHOTTKY BARRIER	535195	28480	5082-2800	REF		
CR12	DIODE, SCHOTTKY BARRIER	535195	28480	5082-2800	REF		
CR13	DIODE, ZENER	246611	04713	1N961B	REF		
CR14	DIODE, ZENER	159798	04713	1N751A	REF		
CR15	DIODE, ZENER	267807	04713	1N9708	REF		
CR16	DIODE, ZENER	267807	04713	1N9708	REF		
CR18	DIODE, SCHOTTKY BARRIER	535195	28480	5082-2800	REF		
CR19	DIODE, SCHOTTKY BARRIER	535195	28480	5082-2800	REF		
CR20	DIODE, RF ATTENUATING	508077	26629	KS8379	16	4	
CR21	DIODE, RF ATTENUATING	508077	26629	KS8379	REF		
CR22	DIODE, RF ATTENUATING	508077	26629	KS8379	REF		
CR23	DIODE, RF ATTENUATING	508077	26629	KS8379	REF		
CR24	DIODE, RF ATTENUATING	508077	26629	KS8379	REF		
CR25	DIODE, RF ATTENUATING	508077	26629	KS8379	REF		
CR26	DIODE, RF ATTENUATING	508077	26629	KS8379	REF		
CR27	DIODE, RF ATTENUATING	508077	26629	KS8379	REF		
CR28	DIODE, RF ATTENUATING	508077	26629	KS8379	REF		
CR29	DIODE, RF ATTENUATING	508077	26629	KS8379	REF		
CR30	DIODE, RF ATTENUATING	508077	26629	KS8379	REF		
CR31	DIODE, RF ATTENUATING	508077	26629	KS8379	REF		
CR32	DIODE, RF ATTENUATING	508077	26629	KS8379	REF		
CR33	DIODE, RF ATTENUATING	508077	26629	KS8379	REF		
CR34	DIODE, RF ATTENUATING	508077	26629	KS8379	REF		
CR35	DIODE, RF ATTENUATING	508077	26629	KS8379	REF		
H1	WASHER, CRESCENT SPRING	544239	89536	544239	4		
J2	CONNECTOR, RF, SMA	512087	16733	705147-001	1		
K1	RELAY, ARMATURE	528638	11532	712-26	4	1	
K2	RELAY, ARMATURE	528638	11532	712-26	REF		
K3	RELAY, ARMATURE	528638	11532	712-26	REF		2
K4	RELAY, ARMATURE	528638	11532	712-26	REF		2
L1	INDUCTOR, 100 UH	249102	24759	MR-100	3		
L2	INDUCTOR, 6-TURN	320911	89536	320911	5		
L3	INDUCTOR, 10-TURN	463448	89536	463448	12		
L4	INDUCTOR, 100 UH	249102	24759	MR-100	REF		
L5	INDUCTOR, 10-TURN	463448	89536	463448	REF		
L6	INDUCTOR, 1500 UH	343863	24759	MR-1500	1		
L9	INDUCTOR, 100 UH	249102	24759	MR-100	REF		
L10	INDUCTOR, 6-TURN	320911	89536	320911	REF		
L11	INDUCTOR, 6-TURN	320911	89536	320911	REF		
L12	INDUCTOR, 6-TURN	320911	89536	320911	REF		
L13	INDUCTOR, 10-TURN	496448	89536	496448	1		
L14	INDUCTOR, 6-TURN	320911	89536	320911	REF		
L15	INDUCTOR, 10-TURN	463448	89536	463448	REF		
L16	INDUCTOR, 10-TURN	463448	89536	463448	REF		
L17	INDUCTOR, 10-TURN	463448	89536	463448	REF		
L18	INDUCTOR, 10-TURN	463448	89536	463448	REF		
L19	INDUCTOR, 10-TURN	463448	89536	463448	REF		
L20	INDUCTOR, 10-TURN	463448	89536	463448	REF		
L21	INDUCTOR, 10-TURN	463448	89536	463448	REF		

Table 6-22. A4A6 X2 Output Amplifier PCB Assembly (6071A) (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
L22	INDUCTOR, 10-TURN	463448	89536	463448	REF		
L23	INDUCTOR, 10-TURN	463448	89536	463448	REF		
L24	INDUCTOR, 10-TURN	463448	89536	463448	REF		
MP1	AIDE, PCB PULL (NOT SHOWN)	541730	89536	541730	3		
MP2	CABLE ANCHOR (NOT SHOWN)	529974	06915	UC-2	1		
MP3	FOOT, RUBBER, BLACK (NOT SHOWN)	513820	89536	513820	7		
MP4	LUG, GROUND (NOT SHOWN)	612200	89536	612200	9		
MP5	SHIELD, W/FINGER CONTACT ASSEMBLY (NOT SHOWN)	633412	89536	633412	1		
MP6	SHIELD, X2-2 (NOT SHOWN)	632349	89536	632349	1		
MP7	COMPONENT HOLDER	422857	98159	2829-75-1	1		
MP8	TAB, COPPER (W/R44)	541672	89536	541672	1		
P1	CONNECTOR RECEPTACLE	544056	89536	544056	1		
Q1	TRANSISTOR, SI, NPN, MICROWAVE	483156	89536	483156	2	1	
Q2	TRANSISTOR, SI, NPN, MICROWAVE	483156	89536	483156	REF		
Q3	TRANSISTOR, SI, PNP	195974	04713	2N3906	1	1	
Q4⊗	TRANSISTOR, D-MOS, FIELD EFFECT	507921	89536	507921	4	1	
Q5⊗	TRANSISTOR, D-MOS, FIELD EFFECT	507921	89536	507921	REF		
Q6	TRANSISTOR, SI, NPN	218396	04713	2N3904	3	1	
Q7	TRANSISTOR, SI, NPN	218396	04713	2N3904	REF		
Q8	TRANSISTOR, SI, NPN	218396	04713	2N3904	REF		
Q10⊗	TRANSISTOR, D-MOS, FIELD EFFECT	507921	89536	507921	REF		
Q11⊗	TRANSISTOR, D-MOS, FIELD EFFECT	507921	89536	507921	REF		
Q12	TRANSISTOR, SI, PNP	473207	01295	TIP30	1	1	
R1	RES, COMP, 18 +/-5%, 1/2W	186007	01121	EB1805	8		
R2	RES, COMP, 18 +/-5%, 1/2W	186007	01121	EB1805	REF		
R3	RES, COMP, 18 +/-5%, 1/2W	186007	01121	EB1805	REF		
R4	RES, COMP, 470 +/-5%, 1/8W	512780	01121	BB4715	8		
R5	RES, DEP. CAR, 8.2 +/-5%, 1/4W	442269	80031	CR251-4-5P8R2	1		
R6	RES, DEP. CAR, 150 +/-5%, 1/4W	343442	80031	CR251-4-5P150E	1		
R7	RES, COMP, 47 +/-5%, 1/8W	512061	01121	BB4705	1		
R8	RES, COMP, 20 +/-5%, 1/8W	574665	01121	BB2005	2		
R9	RES, COMP, 20 +/-5%, 1/8W	574665	01121	BB2005	REF		
R10	RES, COMP, 470 +/-5%, 1/8W	512780	01121	BB4715	REF		
R11	RES, COMP, 51 +/-5%, 1/8W	266262	01121	BB5105	1		
R12	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	3		
R13	RES, DEP. CAR, 39K +/-5%, 1/4W	442400	80031	CR251-4-5P39K	1		
R14	RES, COMP, 470 +/-5%, 1/8W	512780	01121	BB4715	REF		
R15	RES, COMP, 470 +/-5%, 1/8W	512780	01121	BB4715	REF		
R16	RES, COMP, 470 +/-5%, 1/8W	512780	01121	BB4715	REF		
R17	RES, COMP, 470 +/-5%, 1/8W	512780	01121	BB4715	REF		
R18	RES, COMP, 470 +/-5%, 1/8W	512780	01121	BB4715	REF		
R19	RES, COMP, 470 +/-5%, 1/8W	512780	01121	BB4715	REF		
R20	RES, VAR, 500 +/-10%, 1/2W	325613	89536	325613	1		
R21	RES, DEP. CAR, 220 +/-5%, 1/4W	342626	80031	CR251-4-5P220E	1		
R22	RES, COMP, 100 +/-10%, 1/8W	261826	01121	BB1011	1		
R23	RES, DEP. CAR, 200 +/-5%, 1/4W	441451	80031	CR251-4-5P200E	1	1	
R24	RES, DEP. CAR, 270 +/-5%, 1/4W	348789	80031	CR251-4-5P270E	1		
R25	RES, DEP. CAR, 470 +/-5%, 1/4W	343434	80031	CR251-4-5P470E	3		
R26	RES, DEP. CAR, 510 +/-5%, 1/4W	441600	80031	CR251-4-5P510E	1		

Table 6-22. A4A6 X2 Output Amplifier PCB Assembly (6071A) (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
R27	RES, DEP. CAR, 51 +/-5%, 1/4W	414540	80031	CR251-4-5P51E	2		
R28	RES, MTL. FILM, 3.01K +/-1%, 1/8W	312645	91637	CMF553011F	2		
R29	RES, VAR, 25K +/-10%, 1/2W	500769	32997	3299W-W-253	3		
R30	RES, COMP, 18 +/-5%, 1/2W	186007	01121	EB1805	REF		
R31	RES, COMP, 13 +/-5%, 1/2W	519322	01121	EB1305	1		
R32	RES, COMP, 18 +/-5%, 1/2W	186007	01121	EB1805	REF		
R33	RES, COMP, 18 +/-5%, 1/2W	186007	01121	EB1805	REF		
R34	RES, COMP, 18 +/-5%, 1/2W	186007	01121	EB1805	REF		
R35	RES, VAR, 5K +/-10%, 1/2W	327569	11236	360T502A	1		
R36	RES, MTL. FILM, 3.01K +/-1%, 1/8W	312645	91637	CMF553011F	REF		
R37	RES, VAR, 25K +/-10%, 1/2W	500769	32997	3299W-W-253	REF		
R38	RES, COMP, 18 +/-5%, 1/2W	186007	01121	EB1805	REF		
R39	RES, DEP. CAR, 51 +/-5%, 1/4W	414540	80031	CR251-4-5P51E	REF		
R40	RES, MTL. FILM, 1K +/-1%, 1/8W	168229	91637	CMF551C01F	2		
R41	RES, DEP. CAR, 470 +/-5%, 1/4W	343434	80031	CR251-4-5P470E	REF		
R42	RES, COMP, 33 +/-5%, 1W	163063	01121	GB3305	1		
R43	RES, MTL. FILM, 56.9 +/-0.5%, 1/8W	461590	89536	461590	2		2
R44	RES, MTL. FILM, 402 +/-0.5%, 1/8W	461632	89536	461632	1		2
R45	RES, MTL. FILM, 56.9 +/-0.5%, 1/8W	461590	89536	461590	REF		2
R46	RES, DEP. CAR, 470 +/-5%, 1/4W	343434	80031	CR251-4-5P470E	REF		
R47	RES, DEP. CAR, 20K +/-5%, 1/4W	441477	80031	CR251-4-5P20K	2		
R48	RES, COMP, 10 +/-10%, 1/8W	321125	01121	EB1001	1		
R49	RES, DEP. CAR, 100K +/-5%, 1/4W	348920	80031	CR251-4-5P100K	4		
R50	RES, DEP. CAR, 100K +/-5%, 1/4W	348920	80031	CR251-4-5P100K	REF		
R51	RES, DEP. CAR, 13K +/-5%, 1/4W	441402	80031	CR251-4-5P13K	1		
R52	RES, MTL. FILM, 33.2K +/-1%, 1/8W	291393	91637	CMF553322F	1		
R53	RES, VAR, 25K +/-10%, 1/2W	500769	32997	3299W-W-253	REF		
R54	RES, COMP, 130 +/-5%, 1/2W	519314	01121	EB1315	1		
R55	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R56	RES, DEP. CAR, 1.3K +/-5%, 1/4W	441394	80031	CR251-4-5P1K3	1		
R57	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R58	RES, DEP. CAR, 2K +/-5%, 1/4W	441469	80031	CR251-4-5P2K	1		
R59	RES, DEP. CAR, 22K +/-5%, 1/4W	348870	80031	CR251-4-5P22K	1		
R60	RES, VAR, 100K +/-10%, 1/2W	369520	11236	360T-104A	2		
R61	RES, MTL. FILM, 13.0K +/-1%, 1/8W	335539	91637	CMF551302	1		
R62	RES, MTL. FILM, 2.94K +/-1%, 1/8W	261628	91637	CMF552941F	1		
R63	RES, MTL. FILM, 3.83K +/-1%, 1/8W	235143	91637	CMF553831F	1		
R64	RES, MTL. FILM, 6.34K +/-1%, 1/8W	267344	91637	CMF556341F	2		
R65	RES, MTL. FILM, 6.34K +/-1%, 1/8W	267344	91637	CMF556341F	REF		
R66	RES, MTL. FILM, 22.6K +/-1%, 1/8W	288431	91637	CMF552262F	1		
R67	RES, COMP, 2.4K +/-5%, 1/2W	108902	01121	EB2425	1		
R68	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	3		
R69	RES, MTL. FILM, 20K +/-1%, 1/8W	291872	91637	CMF552002F	1		
R70	RES, MTL. FILM, 2.21K +/-1%, 1/8W	347476	91637	CMF552211F	1		
R71	RES, MTL. FILM, 1.78K +/-1%, 1/8W	344366	91637	CMF551781F	1		
R72	RES, DEP. CAR, 100K +/-5%, 1/4W	348920	80031	CR251-4-5P100K	REF		
R73	RES, MTL. FILM, 210 +/-1%, 1/8W	327999	91637	CMF552100F	1		
R74	RES, DEP. CAR, 20K +/-5%, 1/4W	441477	80031	CR251-4-5P20K	REF		
R75	RES, VAR, 100K +/-10%, 1/2W	369520	11236	360T-104A	REF		
R76	RES, MTL. FILM, 1K +/-1%, 1/8W	168229	91637	CMF551001F	REF		

Table 6-22. A4A6 X2 Output Amplifier PCB Assembly (6071A) (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
R77	RES, DEP. CAR, 100K +/-5%, 1/4W	348920	80031	CR251-4-5P100K	REF		
R78	RES, MTL. FILM, 1.96K +/-1%, 1/8W	288423	91637	CMF551961F	1		
R80	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R81	RES, DEP. CAR, 130 +/-5%, 1/4W	442301	80031	CR251-4-5P130E	1		
R82	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R83	RES, DEP. CAR, 82K +/-5%, 1/4W	348912	80031	CR251-4-5P82K	1		
R84	RES, MTL. FILM, 100 +/-1%, 1/8W	168195	91637	CMF551000F	1		
R86	RES, DEP. CAR, 3.9K +/-5%, 1/4W	342600	80031	CR251-4-5P3K9	2		
R87	RES, DEP. CAR, 68K +/-5%, 1/4W	376632	80031	CR251-4-5P68K	1		
R88	RES, DEP. CAR, 3.9K +/-5%, 1/4W	342600	80031	CR251-4-5P3K9	REF		
R89	RES, VAR, 20 +/-20%, 1/2W	275727	11236	360T-200B	1		
R90	RES, COMP, 510 +/-5%, 1/2W	157578	01121	GB5115	1		
R91	RES, VAR, 1K +/-30%, 1/2W	193060	19701	ET50W-102	1		
R92	RES, COMP, 300 +/-5%, 1/8W	512772	01121	BB3015	1		
R93	RES, COMP, 150, +/-5%, 1/8W	153924	01121	BB1515	1		
R94	RES, MTL. FILM, 7.68K +/-1%, 1/8W	370999	91637	CMF557681F	1		
T1	TRANSFORMER	546416	89536	546416	1		
TP1	CONNECTOR, TEST POINT	512889	00779	62395-1	8		
TP2	CONNECTOR, TEST POINT	512889	00779	62395-1	REF		
TP3	CONNECTOR, TEST POINT	512889	00779	62395-1	REF		
TP4	CONNECTOR, TEST POINT	512889	00779	62395-1	REF		
TP5	CONNECTOR, TEST POINT	512889	00779	62395-1	REF		
TP6	CONNECTOR, TEST POINT	512889	00779	62395-1	REF		
TP7	CONNECTOR, TEST POINT	512889	00779	62395-1	REF		
TP8	CONNECTOR, TEST POINT	512889	00779	62395-1	REF		
U1	IC, HYBRID POWER AMP	492751	89536	492751	2	1	
U2	IC, HYBRID POWER AMP	492751	89536	492751	REF		
U3	IC, HYBRID UHF AMP	492744	89536	492744	3	1	
U5	IC, LINEAR, OP-AMP	495051	18324	NE5534N	3	1	
U6	IC, HYBRID UHF AMP	492744	89536	492744	REF		
U7	IC, HYBRID UHF AMP	492744	89536	492744	REF		
U9	IC, HYBRID VHF AMP	490011	89536	490011	1	1	2
U10	IC, TTL, LO-PWR, 3-8 LINE DECODER	407585	01295	SN74LS138N	1	1	
U11	IC, LINEAR, OP-AMP, J-FET INPUT	454454	89536	454454	4	1	
U12	IC, LINEAR, OP-AMP, J-FET INPUT	454454	89536	454454	REF		
U13	IC, LINEAR, OP-AMP, J-FET INPUT	454454	89536	454454	REF		
U14	IC, LINEAR, OP-AMP, J-FET INPUT	454454	89536	454454	REF		
U15	IC, LINEAR, OP-AMP	429951	12040	LF357AH	1	1	
U16	IC, LINEAR, OP-AMP	495051	18324	NE5534N	REF		
U17	IC, LINEAR, OP-AMP	495051	18324	NE5534N	REF		
U18	IC, LINEAR TIMER	402610	18324	NE555N	1	1	
U19	IC, TTL, HEX INVERTER	407593	01295	SN7406N	1	1	2
U20Ⓐ	IC, HYBRID LEVEL DETECTOR	492777	89536	492777	1	1	
U21	SUBTESTED PCB ASSEMBLY	546457	89536	546457	1	1	
U22	SUBTESTED PCB ASSEMBLY	546440	89536	546440	1	1	
U23	SUBTESTED PCB ASSEMBLY	546432	89536	546432	1	1	
U24	SUBTESTED PCB ASSEMBLY	546424	89536	546424	1	1	2
W49	CABLE ASSEMBLY	545806	89536	545806	1		
W57	CABLE ASSEMBLY	535609	89536	535609	1		
XJ1	SOCKET, IC, 14-PIN	370304	12040	MM74C906M	2		

Table 6-22. A4A6 X2 Output Amplifier PCB Assembly (6071A) (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
XU5	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	9		
XU10	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	1		
XU11	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	REF		
XU12	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	REF		
XU13	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	REF		
XU14	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	REF		
XU15	SOCKET, IC, 8-PIN	408450	89536	408450	1		
XU16	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	REF		
XU17	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	REF		
XU18	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	REF		

1 BEFORE ORDERING SPARE PARTS OR SPARE PCB ASSEMBLIES, PLEASE CONTACT YOUR NEAREST JOHN FLUKE SERVICE CENTER

2 IF THESE COMPONENTS FAIL THE USER IS URGED TO RETURN THE GENERATOR TO THE NEAREST JOHN FLUKE SERVICE CENTER.

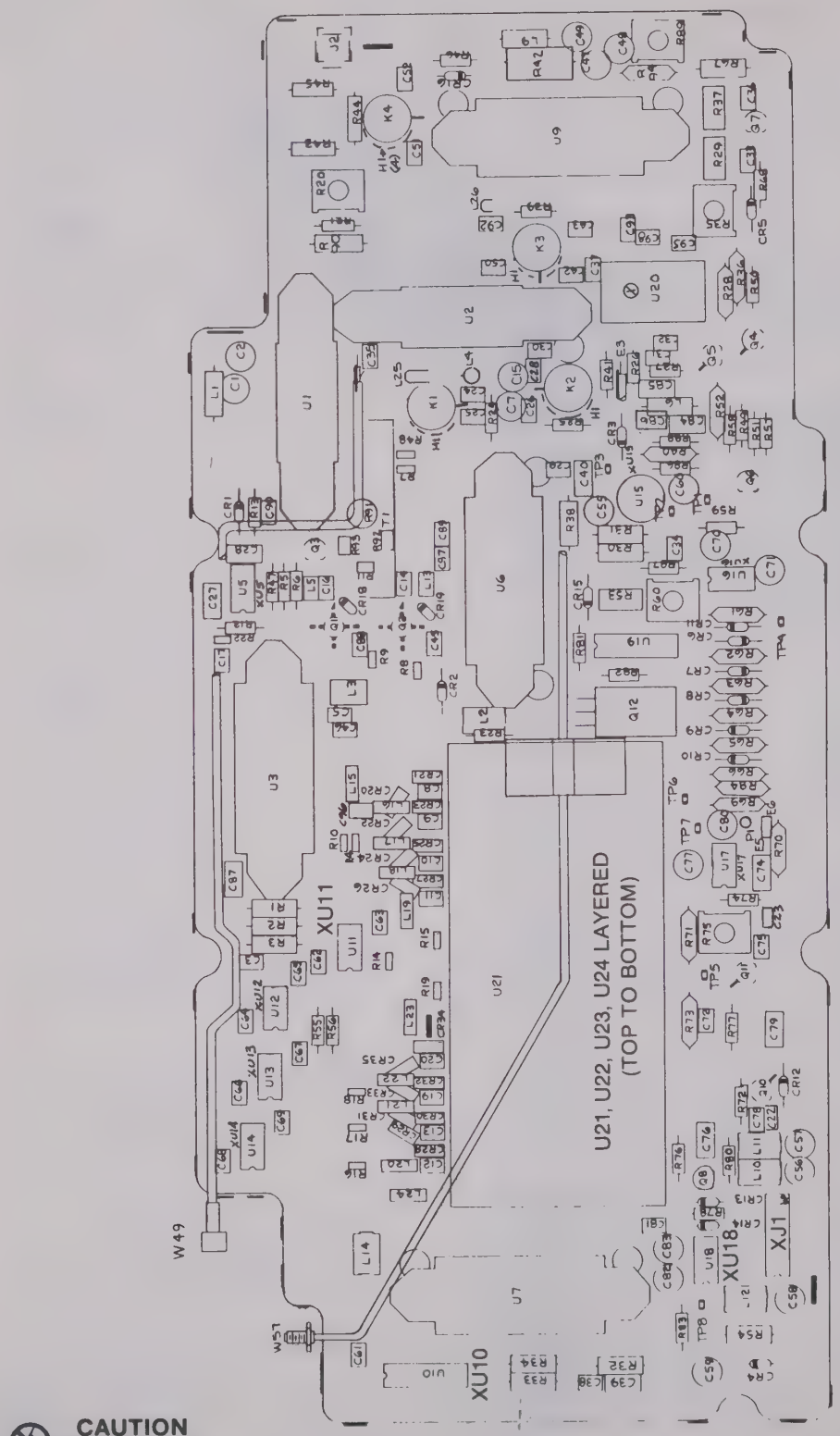


Figure 6-22. A4A6 X2 Output Amplifier PCB Assembly (6071A)

Table 6-23. A4A7 Output Amplifier PCB Assembly (6070A)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
A4A7Ⓐ	OUTPUT AMPLIFIER PCB ASSEMBLY FIGURE 6-23 (6070A-4006T) (USED ON 6070A ONLY)	463505	89536	463505	REF		
C1	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	13		
C2	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	REF		
C3	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	REF		
C4	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	REF		
C5	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	REF		
C6	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	7		
C7	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C8	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C9	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	REF		
C10	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	REF		
C11	CAP, CER, 430 PF +/-5%, 50V	528489	89536	528489	1		
C12	CAP, CER, 1800 PF +/-5%, 50V	528547	89536	528547	1		
C13	CAP, CER, 3.9 PF +/-.25%, 100V	512947	89536	512947	2		
C14	CAP, CER, 27 PF +/-2%, 100V	362749	89536	362749	1		
C15	CAP, CER, 820 PF, 100V	528604	89536	528604	1		
C16	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	REF		
C17	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	REF		
C18	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	REF		
C19	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C20	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C21	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C22	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C23	CAP, CER, 560 PF +/-5%, 50V	528505	89536	528505	2		
C24	CAP, CER, 0.01 UF +/-20%, 100V	407361	72982	8121-A100-W5R-103M	4		
C25	CAP, CER, 560 PF +/-5%, 50V	528505	89536	528505	REF		
C26	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	REF		
C27	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	REF		
C28	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C29	CAP, CER, 100 PF +/-2%, 100V	512848	89536	512848	1		
C31	CAP, MYLAR, 0.22 UF +/-10%, 100V	436113	73445	C280MAH/A220K	1		
C32	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	REF		
C33	CAP, CER, 0.01 UF +/-20%, 100V	407361	72982	8121-A100-W5R-103M	REF		
C34	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	2		
C35	CAP, CER, 0.01 UF +/-20%, 100V	407361	72982	8121-A100-W5R-103M	REF		
C36	CAP, TA, 2.2 UF +/-20%, 35V	485185	56289	196225X0035KA1	3		
C37	CAP, TA, 2.2 UF +/-20%, 35V	485185	56289	196225X0035KA1	REF		
C38	CAP, CER, 2.2 PF +/-0.25PF, 100V	362731	89536	362731	1		
C39	CAP, CER, 3.9 PF +/-.25%, 100V	512947	89536	512947	REF		
C40	CAP, CER, 0.033 UF +/-20%, 50V	543074	72982	8121-050-W5R33NFM	1		
C42	CAP, TA, 2.2 UF +/-20%, 35V	485185	56289	196225X0035KA1	REF		
C43	CAP, CER, 0.01 UF +/-20%, 100V	407361	72982	8121-A100-W5R-103M	REF		
C49	CAP, CER, 5.6 PF +/-.25%, 100V	512954	89536	89536	1		
C53	CAP, CER, 47 PF +/-2%, 100V	512368	89536	512368	1		
CR1	DIODE, SCHOTTKY BARRIER	535195	28480	5082-2800	3	1	
CR2	DIODE, SI, HI-SPEED SWITCHING	203323	07910	1N4448	1	1	
CR3	DIODE, 2 PELLET	375477	09214	MPD-200	1	1	

Table 6-23. A4A7 Output Amplifier PCB Assembly (6070A) (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
CR4	DIODE, ZENER, 3.3V +/-10%	309799	04713	1N746	1	1	
CR5	DIODE, ZENER, 6.2V +/-10%	180497	04713	1N753	1	1	
CR6	DIODE, SCHOTTKY BARRIER	535195	28480	5082-2800	REF		
CR8	DIODE, SCHOTTKY BARRIER	535195	28480	5082-2800	REF		
CR9	DIODE, ZENER, 24.0V +/-5%	267807	04713	1N9708	2	1	
CR10	DIODE, ZENER, 10.0 +/-5%	246611	04713	1N961B	2	1	
CR11	DIODE, ZENER, 24.0V +/-5%	267807	04713	1N9708	REF		
CR13	DIODE, ZENER, 5.1V +/-5%	159798	04713	1N751A	2		
CR14	DIODE, ZENER, 10.0 +/-5%	246611	04713	1N961B	REF		
CR15	DIODE, ZENER, 5.1V +/-5%	159798	04713	1N751A	REF		
E5	CONNECTOR, POST	267500	00779	86144-2	2		
E6	CONNECTOR, POST	267500	00779	86144-2	REF		
H1	WASHER, CRESCENT SPRING (W/K1, K2)	544239	89536	544239	1	1	
J2	CONNECTOR, RF, SMA	512087	16733	705147-001	1		
K1	RELAY, ARMATURE	528638	11532	712-26	2	1	1
K2	RELAY, ARMATURE	528638	11532	712-26	REF		1
L1	INDUCTOR, 100 UH, +/-10%, 120 MA	249102	24759	MR-100	3		
L2	INDUCTOR, 100 UH, +/-10%, 120 MA	249102	24759	MR-100	REF		
L3	CHOKE, 6-TURN	320911	89536	320911	3		
L4	CHOKE, 6-TURN	320911	89536	320911	REF		
L5	CHOKE, 6-TURN	320911	89536	320911	REF		
L6	INDUCTOR, 1500 UH +/-10%	343863	24759	MR-1500	1		
L7	INDUCTOR, 100 UH, +/-10%, 120 MA	249102	24759	MR-100	REF		
MP1	AIDE, PCB, PULL (NOT SHOWN)	541730	89536	541730	4		
MP2	CABLE MOUNT (NOT SHOWN)	546374	89536	546374	1		
MP3	COMPONENT HOLDER	422857	98159	2829-75-1	1		
MP4	FOOT, RUBBER, BLACK (NOT SHOWN)	513820	89536	513820	4		
MP5	SOCKET, COMPONENT LEAD (NOT SHOWN)	376418	22526	75060-007	63		
P1	CONNECTOR, RECEPTACLE	544056	89536	544056	1		
Q1⊗	TRANSISTOR, DMOS, FIELD EFFECT	507921	89536	507921	4	1	
Q2⊗	TRANSISTOR, DMOS, FIELD EFFECT	507921	89536	507921	REF		
Q3	TRANSISTOR, NPN	218396	89536	218396	3	1	
Q4⊗	TRANSISTOR, DMOS, FIELD EFFECT	507921	89536	507921	REF		
Q5⊗	TRANSISTOR, DMOS, FIELD EFFECT	507921	89536	507921	REF		
Q7	TRANSISTOR, NPN	218396	89536	218396	REF		
Q8	TRANSISTOR, NPN	218396	89536	218396	REF		
R1	RES, COMP, 510 +/-5%, 1/4W	441600	01121	005115	1		
R2	RES, MTL. FILM, 3.01K +/-1%, 1/8W	312645	91637	CMF553011F	2		
R3	RES, DEP. CAR, 51 +/-5%, 1/4W	414540	80031	CR251-4-5P51E	2		
R4	RES, VAR, 25K +/-10%, 1/2W	500769	32997	3299W-W-253	3		
R5	RES, MTL. FILM, 3.01K +/-1%, 1/8W	312645	91637	CMF553011F	REF		
R6	RES, VAR, 25K +/-10%, 1/2W	500769	32997	3299W-W-253	REF		
R7	RES, COMP, 130 +/-5%, 1/2W	519314	89536	519314	1		
R8	RES, MTL. FILM, 1K +/-1%, 1/8W	168229	91637	CMF551001F	3		
R9	RES, VAR, 25K +/-10%, 1/2W	500769	32997	3299W-W-253	REF		
R10	RES, DEP. CAR, 3.9K +/-5%, 1/4W	342600	80031	CR251-4-5P3K9	2		
R11	RES, MTL. FILM, 33.2K +/-1%, 1/8W	291393	91637	CMF553322F	1		
R12	RES, DEP. CAR, 3.9K +/-5%, 1/4W	342600	80031	CR251-4-5P3K9	REF		
R13	RES, COMP, 100K +/-5%, 1/4W	148189	01121	CB1045	4		
R14	RES, COMP, 100K +/-5%, 1/4W	148189	01121	CB1045	REF		

Table 6-23. A4A7 Output Amplifier PCB Assembly (6070A) cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
R15	RES, DEP. CAR, 13 +/-5%, 1/4W	442186	80031	CR251-4-5P13E	1		
R16	RES, DEP. CAR, 51 +/-5%, 1/4W	414540	80031	CR251-4-5P51E	REF		
R17	RES, MTL. FILM, 13.0K +/-1%, 1/8W	335539	91637	CMF551302F	1		
R18	RES, MTL. FILM, 2.94K +/-1%, 1/8W	261628	91637	CMF552941K	1		
R19	RES, MTL. FILM, 3.83K +/-1%, 1/8W	235143	91637	CMF553831F	1		
R20	RES, MTL. FILM, 6.34K +/-1%, 1/8W	267344	91637	CMF556341F	2		
R21	RES, DEP. CAR, 10K +/-, 1/4W	348839	89536	348839	1		
R22	RES, DEP. CAR, 2K +/-5%, 1/4W	441496	80031	CR251-4-5P2K	1		
R23	RES, DEP. CAR, 22K +/-5%, 1/4W	348870	80031	CR251-4-5P22K	1		
R24	RES, VAR, 100K +/-10%, 1/2W	369520	11236	360T-104A	2		
R25	RES, DEP. CAR, 68K +/-5%, 1/4W	376632	80031	CR251-4-5P68K	1		
R26	RES, MTL. FILM, 20K +/-1%, 1/8W	291872	91637	CMF552002F	1		
R27	RES, MTL. FILM, 2.21K +/-1%, 1/8W	347476	91637	CMF552211F	1		
R28	RES, DEP. CAR, 470 +/-5%, 1/4W	343434	89536	343434	2		
R29	RES, COMP, 2.4K +/-5%, 1/2W	108902	01121	EB2K45	1		
R30	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	3		
R31	RES, MTL. FILM, 56.9 +/-0.5%, 1/4W	461590	89536	461590	2		1
R32	RES, MTL. FILM, 402 +/-0.5%, 1/8W	461632	89536	461632	1		1
R33	RES, MTL. FILM, 56.9 +/-0.5%, 1/4W	461590	89536	461590	REF		1
R34	RES, DEP. CAR, 470 +/-5%, 1/4W	343434	89536	343434	REF		
R35	RES, COMP, 100K +/-5%, 1/4W	148189	01121	CB1045	REF		
R36	RES, VAR, 100K +/-10%, 1/2W	369520	11236	360T-104A	REF		
R37	RES, MTL. FILM, 1K +/-1%, 1/8W	168229	91637	CMF551001F	REF		
R38	RES, COMP, 100K +/-5%, 1/4W	148189	01121	CB1045	REF		
R39	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R40	RES, DEP. CAR, 82K +/-5%, 1/4W	348912	80031	CR251-4-5P82K	1		
R41	RES, DEP. CAR, 2.4K +/-5%, 1/4W	441493	80031	CR251-4-5P2K4	1		
R42	RES, MTL. FILM, 1K +/-1%, 1/8W	168229	91637	CMF551001F	REF		
R43	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R44	RES, MTL. FILM, 6.34K +/-1%, 1/8W	267344	91637	CMF556341F	REF		
R46	RES, MTL. FILM, 22.6K +/-1%, 1/8W	288431	91637	CMF552262F	1		
R47	RES, MTL. FILM, 100 +/-1%, 1/8W	168195	91637	CMF551000F	1		
R48	RES, VAR, 5K +/-10%, 1/2W	327569	11236	360T502A	1		
R50	RES, COMP, 820 +/-5%, 1/8W	512806	01121	BB1-882105	2		
R51	RES, COMP, 5.6 +/-5%, 1/4W	208033	01121	CB56G5	1		
R52	RES, COMP, 820 +/-5%, 1/8W	512806	01121	BB1-882105	REF		
R53	RES, DEP. CAR, 20K +/-5%, 1/4W	441477	80031	CR251-4-5P20K	1		
R54	RES, COMP, 27 +/-5%, 1/8W	266254	01121	BB1-82705	1		
R55	RES, DEP. CAR, 220 +/-5%, 1/4W	342626	80031	CR251-4-5P220E	2		
R56	RES, VAR, 500 +/-10%, 1/2W	325613	89536	325613	2		
R57	RES, VAR, 500 +/-10%, 1/2W	325613	89536	325613	REF		
R58	RES, DEP. CAR, 220 +/-5%, 1/4W	342626	80031	CR251-4-5P220E	REF		
R61	RES, COMP, 510 +/-5%, 1/2W	108951	01121	RC020GF511-JS	1		
TP1	CONNECTOR (FASTON TAP)	512889	02660	62395-1834	8		
TP2	CONNECTOR (FASTON TAP)	512889	02660	62395-1834	REF		
TP3	CONNECTOR (FASTON TAP)	512889	02660	62395-1834	REF		
TP4	CONNECTOR (FASTON TAP)	512889	02660	62395-1834	REF		
TP5	CONNECTOR (FASTON TAP)	512889	02660	62395-1834	REF		
TP6	CONNECTOR (FASTON TAP)	512889	02660	62395-1834	REF		
TP7	CONNECTOR (FASTON TAP)	512889	02660	62395-1834	REF		

Table 6-23. A4A7 Output Amplifier PCB Assembly (6070A) (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
TP8	CONNECTOR (FASTON TAP)	512889	02660	62395-1834	REF		
U1	7DB POWER AMPLIFIER	492751	89536	492751	3	1	
U2	7DB POWER AMPLIFIER	492751	89536	492751	REF		
U3Ø	LEVEL DETECTOR	492777	89536	492777	1	1	1
U4	IC, LIN, OP AMP	429951	12040	LF357AH	1	1	
U5	IC, OP-AMP, LO-NOISE	477745	18324	NE5534AN	2	1	
U6	7DB POWER AMPLIFIER	492751	89536	492751	REF		1
U7	IC, OP-AMP, LO-NOISE	477745	18324	NE5534AN	REF		
U8	IC, TTL, BUFFERS AND INTERFACE GATES	407593	01295	SN7406	1	1	
U9	IC, LINEAR TIMER	402610	18324	NE555N	1	1	
W47	CABLE ASSEMBLY	577288	89536	577288	1		
W49	CABLE ASSEMBLY	524983	89536	524983	1		
XJ1	SOCKET, 14-PIN	370304	12040	MM74C906N	2		
XU4	SOCKET, IC, 8-PIN	408450	89536	408450	1		
XU5	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	3		
XU7	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	REF		
XU8	SOCKET, IC, 14-PIN	370304	12040	MM74C906N	REF		
XU9	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	REF		

1 IF THESE COMPONENTS FAIL THE USER IS URGED TO RETURN THE GENERATOR TO THE NEAREST JOHN FLUKE SERVICE CENTER.

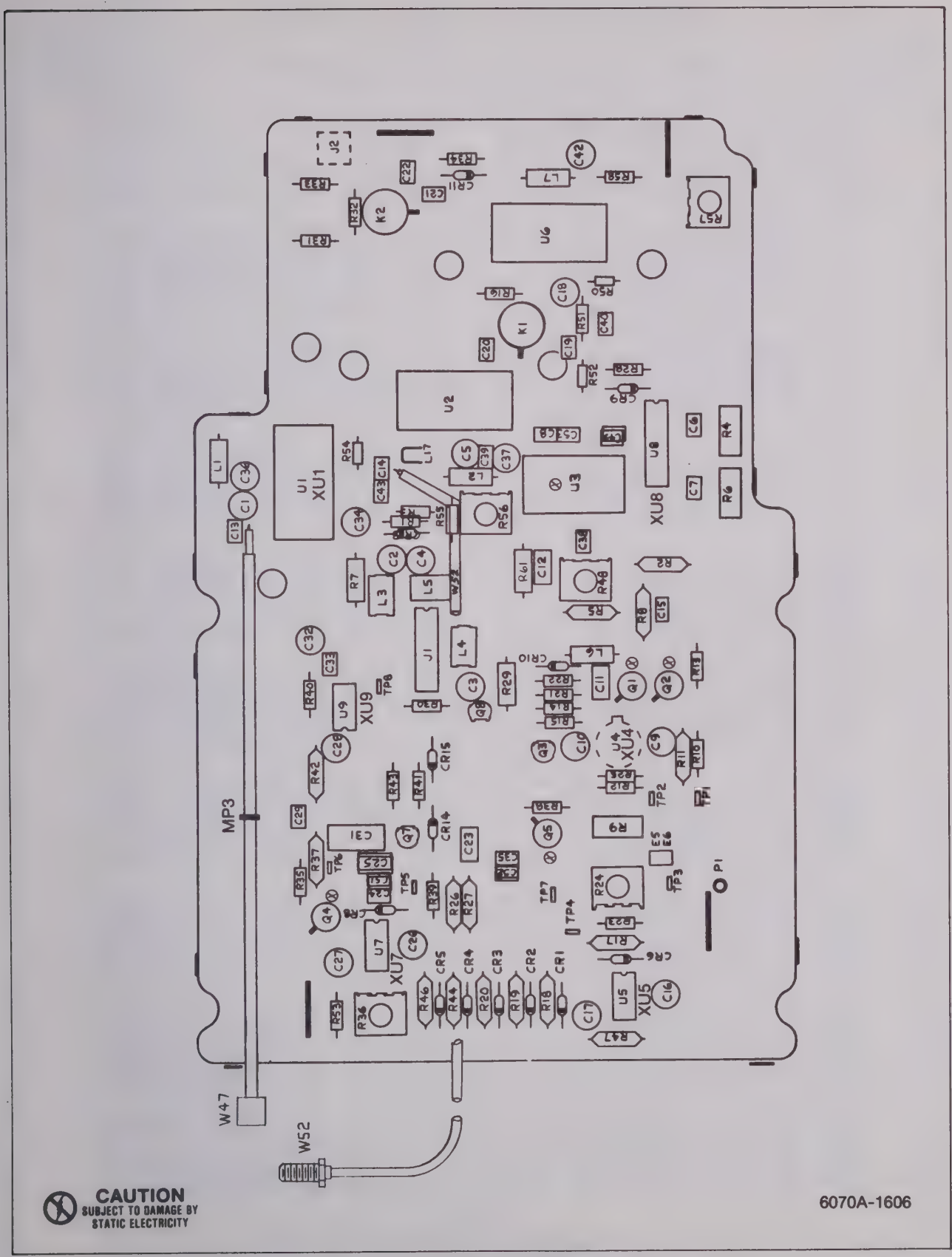


Figure 6-23. A4A7 Output Amplifier PCB Assembly (6070A)

Table 6-24. A4A8 Hetrodyne Oscillator PCB Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
A4A8Ⓧ	HETRODYNE OSCILLATOR PCB ASSEMBLY FIGURE 6-24 (6070A-4015T)	463588	89536	463588	REF		1
C1	CAP, TA, 39 UF +/-20%, 6V	163915	56289	196D396X0006	5		
C2	CAP, TA, 22 UF +/-20%, 15V	423012	56289	196D226X0015KA1	3		
C3	CAP, TA, 10 UF +/-20%, 35V	417683	56289	196D106X0035KA1	1		
C4	CAP, TA, 22 UF +/-20%, 15V	423012	56289	196D226X0015KA1	REF		
C5	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	18		
C6	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C7	CAP, TA, 39 UF +/-20%, 6V	163915	56289	196D396X0006	REF		
C8	CAP, TA, 39 UF +/-20%, 6V	163915	56289	196D396X0006	REF		
C9	CAP, CER, 100 PF +/-2%, 100V	512848	89536	512848	2		
C10	CAP, CER, 0.05 UF -20/+80%, 25V	148924	72982	5855-000-Y5U0-503Z	5		
C11	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	1		
C12	CAP, TA, 0.47 UF +/-20%, 35V	161349	56289	196D474X0035HA1	8		
C13	CAP, TA, 0.47 UF +/-20%, 35V	161349	56289	196D474X0035HA1	REF		
C14	CAP, TA, 39 UF +/-20%, 6V	163915	56289	196D396X0006	REF		
C15	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C16	CAP, TA, 39 UF +/-20%, 6V	163915	56289	196D396X0006	REF		
C17	CAP, TA, 0.47 UF +/-20%, 35V	161349	56289	196D474X0035HA1	REF		
C18	CAP, TA, 0.47 UF +/-20%, 35V	161349	56289	196D474X0035HA1	REF		
C19	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C20	CAP, CER, 0.68 PF +/-1%, 100V	485011	89536	485011	2		2
C22	CAP, CER, 3.9 PF +/-0.25PF, 100V	512947	89536	512947	2		
C23	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C24	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C25	CAP, CER, 0.05 UF -20/+80%, 25V	148924	72982	5855-000-Y5U0-503Z	REF		
C26	CAP, MYLAR, 0.033 UF +/-10%, 250V	234492	73445	C280MAE/A33K	2		
C27	CAP, CER, 0.05 UF -20/+80%, 25V	148924	72982	5855-000-Y5U0-503Z	REF		
C28	CAP, CER, 0.05 UF -20/+80%, 25V	148924	72982	5855-000-Y5U0-503Z	REF		
C29	CAP, MYLAR, 0.033 UF +/-10%, 250V	234492	73445	C280MAE/A33K	REF		
C30	CAP, TA, 0.47 UF +/-20%, 35V	161349	56289	196D474X0035HA1	REF		
C31	CAP, TA, 0.47 UF +/-20%, 35V	161349	56289	196D474X0035HA1	REF		
C32	CAP, CER, 39 PF +/-2%, 100V	512962	89536	512962	8		
C33	CAP, CER, 39 PF +/-2%, 100V	512962	89536	512962	REF		
C34	CAP, CER, 39 PF +/-2%, 100V	512962	89536	512962	REF		
C35	CAP, CER, 39 PF +/-2%, 100V	512962	89536	512962	REF		
C36	CAP, POLY, 0.1 UF +/-10%, 100V	393439	89536	393439	1		
C37	CAP, CER, 39 PF +/-2%, 100V	512962	89536	512962	REF		
C38	CAP, CER, 39 PF +/-2%, 100V	512962	89536	512962	REF		
C39	CAP, CER, 5.6 PF +/-0.25PF, 100V	512954	89536	512954	1		
C40	CAP, CER, 39 PF +/-2%, 100V	512962	89536	512962	REF		
C41	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	1		
C42	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C43	CAP, CER, 0.05 UF -20/+80%, 25V	148924	72982	5855-000-Y5U0-503Z	REF		
C44	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C45	CAP, CER, 3.9 PF +/-0.25PF, 100V	512947	89536	512947	REF		
C46	CAP, CER, 39 PF +/-2%, 100V	512962	89536	512962	REF		
C47	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C48	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		

Table 6-24. A4A8 Hetrodyne Oscillator PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
C49	CAP, CER, 0.68 PF +/-1%, 100V	485011	89536	485011	REF		2
C50	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C51	CAP, TA, 47 UF +/-20%, 20V	348516	56289	196D476X0020KE4	1		
C52	CAP, TA, 22 UF +/-20%, 15V	423012	56289	196D226X0015KA1	REF		
C53	CAP, CER, 18 PF +/-2%, 100V	512335	89536	512335	1		
C54	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C55	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C56	CAP, TA, 0.47 UF +/-20%, 35V	161349	56289	196D474X0035HA1	REF		
C57	CAP, TA, 0.47 UF +/-20%, 35V	161349	56289	196D474X0035HA1	REF		
C58	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C59	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C60	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C61	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C62	CAP, TA, 2.2 UF +/-20%, 15V	364216	56289	196225X0015HA1	1		
C64	CAP, VAR, 1.7 - 10 PF, 250V	321109	89536	321109	1		2
C65	CAP, CER, 100 PF +/-2%, 100V	512848	89536	512848	REF		
C66	CAP, TA, 82 UF +/-20%, 20V	357392	12954	D82GS2D20M	1		
C69	CAP, TA, 1 UF +/-20%, 35V	161919	56289	196D010X0035G	1		
C70	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C71	CAP, CER, 1000 PF +/-5%, 50V	528539	89536	528539	3		
C72	CAP, CER, 1000 PF +/-5%, 50V	528539	89536	528539	REF		
C73	CAP, CER, 430 PF +/-5%, 50V	528489	89536	528489	2		
C74	CAP, CER, 430 PF +/-5%, 50V	528489	89536	528489	REF		
C75	CAP, CER, 1000 PF +/-5%, 50V	528539	89536	528539	REF		
CR1	DIODE, SI	368738	04713	1N4004	1	1	
CR2	DIODE, MICROWAVE TUNING	508010	89536	508010	2	1	2
CR3	DIODE, MICROWAVE TUNING	508010	89536	508010	REF		2
CR5	DIODE, HI-SPEED SWITCHING	203323	07910	1N4448	1		
CR6	DIODE, SI, SMALL SIGNAL	313247	28484	HP5082-6264	2		
CR7	DIODE, SI, SMALL SIGNAL	313247	28484	HP5082-6264	REF		
CR8	DIODE, ZENER, UNCOMPENSATED	325811	07910	1N753A	2		
CR9	DIODE, ZENER, UNCOMPENSATED	325811	07910	1N753A	REF		
J1	CONNECTOR, RF, SMB	512095	16733	702033	1		
J4	CONNECTOR, RF, SMA	512087	16733	705147-001	2		
J5	CONNECTOR, RF, SMA	512087	16733	705147-001	REF		
K1	RELAY, SPST	461434	15636	R7254-1	1		
L1	INDUCTOR, COIL, 6-TURN	320911	89536	320911	8		
L2	INDUCTOR, COIL, 6-TURN	320911	89536	320911	REF		
L3	INDUCTOR, COIL, 6-TURN	320911	89536	320911	REF		
L4	INDUCTOR, COIL, 6-TURN	320911	89536	320911	REF		
L5	INDUCTOR, COIL, 6-TURN	320911	89536	320911	REF		
L6	INDUCTOR, COIL, 6-TURN	320911	89536	320911	REF		
L7	INDUCTOR, VARIABLE	528943	89536	528943	2		2
L8	INDUCTOR, VARIABLE	528943	89536	528943	REF		2
L9	INDUCTOR, COIL, 10-TURN	496448	89536	496448	4		
L10	INDUCTOR, COIL, 10-TURN	496448	89536	496448	REF		
L11	INDUCTOR, COIL, 6-TURN	320911	89536	320911	REF		
L12	INDUCTOR, COIL, 6-TURN	320911	89536	320911	REF		
L13	INDUCTOR, COIL, 10-TURN	496448	89536	496448	REF		
L14	INDUCTOR, COIL, 10-TURN	496448	89536	496448	REF		

Table 6-24. A4A8 Hetrodyne Oscillator PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
L15	CHOKE, CORE	321182	89536	321182	1		
MP1	AIDE, PCB PULL (NOT SHOWN)	541730	89536	541730	2		
MP2	SOCKET, INSERT (NOT SHOWN)	376418	89536	376418	94		
P1	CONNECTOR, RECEPTACLE	544056	00779	50871-1	7		
P2	CONNECTOR, RECEPTACLE	544056	00779	50871-1	REF		
Q1	TRANSISTOR, SI, NPN	218396	04713	2N3904	1	1	
Q2	TRANSISTOR, SI, PNP	195974	04713	2N3906	1	1	
Q3	TRANSISTOR, SI, NPN, MICROWAVE	483156	89536	483156	1	1	2
R1	RES, DEP. CAR, 47K +/-5%, 1/4W	348896	80031	CR251-4-5P47K	2		
R2	RES, DEP. CAR, 47K +/-5%, 1/4W	348896	80031	CR251-4-5P47K	REF		
R3	RES, DEP. CAR, 6.8K +/-5%, 1/4W	368761	80031	CR251-4-5P6K8	2		
R4	RES, MTL. FILM, 1.87K +/-1%, 1/8W	267229	91637	CMF551871F	1		
R5	RES, DEP. CAR, 24K +/-5%, 1/4W	442384	80031	CR251-4-5P24K	2		
R6	RES, MTL. FILM, 7.15K +/-1%, 1/8W	260356	91637	CMF557151F	1		
R7	RES, DEP. CAR, 24K +/-5%, 1/4W	442384	80031	CR251-4-5P24K	REF		
R8	RES, VAR, 50K +/-10%, 1/2W	288290	89536	288290	REF		
R9	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	9		
R10	RES, DEP. CAR, 2.4K +/-5%, 1/4W	441493	80031	CR251-4-5P2K4	1		
R11	RES, VAR, 50K +/-10%, 1/2W	288290	89536	288290	2		
R12	RES, DEP. CAR, 30K +/-5%, 1/4W	368753	80031	CR251-4-5P30K	2		
R13	RES, VAR, 10K +/-10%, 1/2W	285171	89536	285171	1		
R14	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R15	RES, DEP. CAR, 30K +/-5%, 1/4W	368753	80031	CR251-4-5P30K	REF		
R16	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	4		
R17	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R18	RES, VAR, 10K +/-10%, 1/2W	309674	75378	360T-103A	1		
R19	RES, MTL. FILM, 140K +/-1%, 1/8W	289439	91637	CMF551403F	1		
R20	RES, DEP. CAR, 1.6K +/-5%, 1/4W	348805	80031	CR251-4-5P1K6	1		
R21	RES, DEP. CAR, 3.9K +/-5%, 1/4W	342600	80031	CR251-4-5P3K9	1		
R22	RES, DEP. CAR, 5.1K +/-5%, 1/4W	368712	80031	CR251-4-5P5K1	1		
R23	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R25	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R26	RES, MTL. FILM, 68.1K +/-1%, 1/8W	236828	91637	CMF556812F	1		
R27	RES, COMP, 2K +/-5%, 1/8W	246959	01121	BB2025	1		
R28	RES, COMP, 220 +/-10%, 1/8W	153957	01121	BB2211	1		
R29	RES, MTL. FILM, 34K +/-1%, 1/8W	261602	91637	CMF553402F	2		
R30	RES, MTL. FILM, 34K +/-1%, 1/8W	261602	91637	CMF553402F	REF		
R31	RES, MTL. FILM, 340K +/-1%, 1/8W	375949	91637	CMF553403F	1		
R32	RES, DEP. CAR, 5.1 +/-5%, 1/4W	441287	80031	CR251-4-5P5R1	1		
R33	RES, DEP. CAR, 180 +/-5%, 1/4W	441436	80031	CR251-4-5P180E	1		
R34	RES, COMP, 180 +/-5%, 1/8W	512756	01121	BB1815	2		
R35	RES, COMP, 30 +/-5%, 1/8W	512723	01121	BB3005	1		
R36	RES, COMP, 180 +/-5%, 1/8W	512756	01121	BB1815	REF		
R37	RES, DEP. CAR, 510 +/-5%, 1/4W	441600	80031	CR251-4-5P510E	10		
R38	RES, DEP. CAR, 510 +/-5%, 1/4W	441600	80031	CR251-4-5P510E	REF		
R39	RES, DEP. CAR, 510 +/-5%, 1/4W	441600	80031	CR251-4-5P510E	REF		
R40	RES, DEP. CAR, 51 +/-5%, 1/4W	414540	80031	CR251-4-5P51E	4		
R41	RES, MTL. FILM, 15.4K +/-1%, 1/8W	261651	91637	CMF551542F	2		
R42	RES, DEP. CAR, 510 +/-5%, 1/4W	441600	80031	CR251-4-5P510E	REF		
R43	RES, DEP. CAR, 510 +/-5%, 1/4W	441600	80031	CR251-4-5P510E	REF		

Table 6-24. A4A8 Hetrodyne Oscillator PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
R44	RES, DEP. CAR, 510 +/-5%, 1/4W	441600	80031	CR251-4-5P510E	REF		
R45	RES, DEP. CAR, 6.2K +/-5%, 1/4W	442368	80031	CR251-4-5P6K2	2		
R46	RES, DEP. CAR, 510 +/-5%, 1/4W	441600	80031	CR251-4-5P510E	REF		
R47	RES, MTL. FILM, 15.4K +/-1%, 1/8W	261651	91637	CMF551542F	REF		
R48	RES, DEP. CAR, 510 +/-5%, 1/4W	441600	80031	CR251-4-5P510E	REF		
R49	RES, DEP. CAR, 510 +/-5%, 1/4W	441600	80031	CR251-4-5P510E	REF		
R50	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R51	RES, DEP. CAR, 5.6K +/-5%, 1/4W	442350	80031	CR251-4-5P5K6	1		
R52	RES, DEP. CAR, 6.2K +/-5%, 1/4W	442368	80031	CR251-4-5P6K2	REF		
R53	RES, DEP. CAR, 160 +/-5%, 1/4W	441410	80031	CR251-4-5P160E	1		
R54	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R58	RES, DEP. CAR, 51 +/-5%, 1/4W	414540	80031	CR251-4-5P51E	REF		
R59	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R60	RES, DEP. CAR, 51 +/-5%, 1/4W	414540	80031	CR251-4-5P51E	REF		
R61	RES, DEP. CAR, 51 +/-5%, 1/4W	414540	80031	CR251-4-5P51E	REF		
R62	RES, DEP. CAR, 330 +/-5%, 1/4W	368720	80031	CR251-4-5P330E	1		
R64	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R65	RES, DEP. CAR, 100 +/-5%, 1/4W	348771	80031	CR251-4-5P100E	1		
R66	RES, COMP, 18 +/-5%, 1/8W	500397	01121	BB1805	1		
R67	RES, COMP, 300 +/-5%, 1/8W	512772	01121	BB3015	2		
R68	RES, COMP, 300 +/-5%, 1/8W	512772	01121	BB3015	REF		
R70	RES, COMP, 47 +/-5%, 1/8W	272211	01121	BB4705	1		
R71	RES, COMP, 120 +/-5%, 1/8W	513978	01121	BB1215	2		
R72	RES, COMP, 120 +/-5%, 1/8W	513978	01121	BB1215	REF		
R73	RES, MTL. FILM, 102K +/-1%, 1/8W	291286	91637	CMF551023F	1		
R74	RES, DEP. CAR, 510 +/-5%, 1/4W	441600	80031	CR251-4-5P510E	REF		
R75	RES, VAR, 25K +/-10%, 1/2W	494591	11236	360T-253A	1		
R76	RES, DEP. CAR, 6.8K +/-5%, 1/4W	368761	80031	CR251-4-5P6K8	REF		
R77	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R78	RES, COMP, 10K +/-10%, 1/8W	246975	01121	BB1031	1		
R79	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R80	RES, DEP. CAR, 100 +/-5%, 1/4W	348771	80031	CR251-4-5P100E	1		
R81	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R82	RES, DEP. CAR, 30 +/-5%, 1/4W	442228	80031	CR251-4-5P30E	1		
RT1	RES, THERMISTOR, TEMP SENSITIVE	104596	89536	104596	1		2
S1	SWITCH, SLIDE, DPDT	393629	10389	23-021-114	3	1	2
S2	SWITCH, SLIDE, DPDT	393629	10389	23-021-114	REF		
S3	SWITCH, SLIDE, DPDT	393629	10389	23-021-114	REF		
T1	TRANSFORMER	469064	89536	469064	1		
TP1	CONNECTOR, TEST POINT (NOT SHOWN)	512889	00779	62395-1	4		
TP2	CONNECTOR, TEST POINT (NOT SHOWN)	512889	00779	62395-1	REF		
TP3	SOCKET, CONNECTOR (NOT SHOWN)	352450	98291	51-051-0000	1		
TP4	CONNECTOR, TEST POINT (NOT SHOWN)	512889	00779	62395-1	REF		
TP5	CONNECTOR, TEST POINT	512889	00779	62395-1	REF		
U1	IC, LINEAR TIMER	402610	18324	NE555N	1	1	
U2	IC, TTL, 4-BIT BINARY COUNTER	320739	01295	SN7493N	1	1	
U3	IC, MONOLITHIC, 10-BIT D/A CONVERTER	477760	24355	AD561J	1	1	
U4	IC, LINEAR, OP-AMP	472779	12040	LF386N	1	1	
U5	IC, LINEAR VOLTAGE REGULATOR	379420	04713	MC1723CL	1	1	
U6	IC, LINEAR, OP-AMP, J-FET INPUT	483438	89536	483438	1	1	

Table 6-24. A4A8 Hetrodyne Oscillator PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
U7	IC, LO-PWR SCHOTTKY	404186	01295	SN74LS123N	1	1	
U8	IC, TTL, QUAD, 2-INPUT NOR GATE	393041	01295	SN74LS02N	1	1	
U9	IC, DUAL, 4-BIT DECADE & BINARY COUNTERS	419069	01295	SN74393N	1	1	
U10	IC, LINEAR COMPARATOR	352195	01295	SN72311P	1	1	
U11	IC, 8-CHANNEL MULTIPLEX SWITCH	508036	17856	S13705-193K	1	1	
U12⊗	IC, S.A.W.	429662	89536	429662	1	1	2
U13	IC, IODB AMP	492710	89536	492710	3	1	
U14	IC, 6DB, 150 AMP	492819	89536	492819	2	1	
U15	IC, TTL, QUAD 2-IN NOR GATE	288845	01295	SN7402N	1	1	
U16	IC, ECL, BI-QUINARY COUNTER	525337	04713	MC10138L	1	1	
U17	IC, ECL, 2-MOD PRESCALER	454900	89536	454900	1	1	
U18	IC, 6DB, 150 AMP	492819	89536	492819	REF		
U19	IC, ECL, PHASE FREQUENCY DETECTOR	525311	04713	MC12040L	1	1	
U20	IC, IODB AMP	492710	89536	492710	REF		
U21	IC, IODB AMP	492710	89536	492710	REF		
U22	RESISTOR NETWORK	412924	89536	412924	1	1	
U23	IC, LINEAR, LO-NOISE DUAL OP-AMP	504720	18324	NE5532FE	1	1	
W1	HYBRID COUPLER	526509	89536	526509	2		
W2	HYBRID COUPLER	526509	89536	526509	REF		
W4	CABLE ASSEMBLY, RFC	539114	89536	539114	1		
XU1	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	5		
XU2	SOCKET, IC, 14-PIN	276527	91507	314-AG39D	7		
XU3	SOCKET, IC, 16-PIN	276535	91506	316-AG39D	2		
XU4	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	REF		
XU5	SOCKET, IC, 14-PIN	276527	91507	314-AG39D	REF		
XU6	SOCKET, IC, 14-PIN	276527	91507	314-AG39D	REF		
XU7	SOCKET, IC, 16-PIN	276535	91506	316-AG39D	REF		
XU8	SOCKET, IC, 14-PIN	276527	91507	314-AG39D	REF		
XU9	SOCKET, IC, 14-PIN	276527	91507	314-AG39D	REF		
XU10	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	REF		
XU11	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	REF		
XU12	INSULATOR, TO-8	577775	89536	577775	1		
XU15	SOCKET, IC, 14-PIN	276527	91507	314-AG39D	REF		
XU19	SOCKET, IC, 14-PIN	276527	91507	314-AG39D	REF		
XU23	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	REF		

1 BEFORE ORDERING SPARE PARTS OR SPARE PCB ASSEMBLIES, PLEASE CONTACT YOUR NEAREST JOHN FLUKE SERVICE CENTER FOR INFORMATION.

2 IF THESE COMPONENTS FAIL, THE USER IS URGED TO RETURN THE GENERATOR TO THE NEAREST JOHN FLUKE SERVICE CENTER.

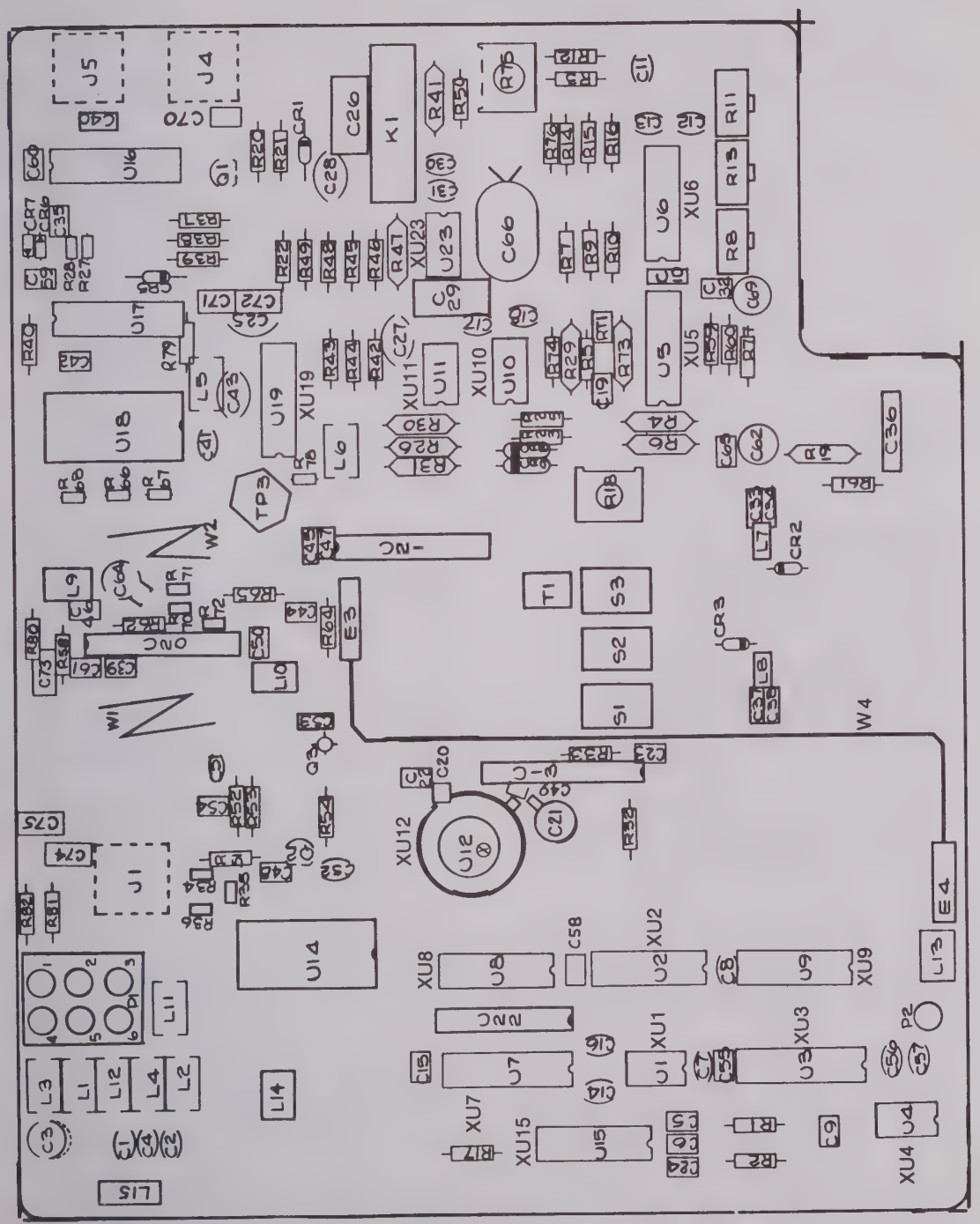


Figure 6-24. A4A8 Hetrodyne Oscillator PCB Assembly

Table 6-25. A4A9 Hetrodyne Converter PCB Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
A4A9	HETRODYNE CONVERTER PCB ASSEMBLY FIGURE 6-25 (6070A-4013T)	463562	89536	463562	REF		
C1	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	11		
C2	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C3	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C4	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C5	CAP, CER, 39 PF +/-2%, 100V	512962	89536	512962	5		
C6	CAR, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	7		
C7	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	REF		
C8	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C9	CAP, CER, 39 PF +/-2%, 100V	512962	89536	512962	REF		
C10	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C11	CAP, VAR, 2.5 - 10 PF, 100VDC	460725	80031	CT5E2R510-A	1		
C12	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	REF		
C13	CAP, CER, 39 PF +/-2%, 100V	512962	89536	512962	REF		
C14	CAP, CER 47 PF +/-2%, 100V	512368	89536	512368	1		
C15	CAP, VAR, 1.5 - 4 PF, 100VDC	529925	91293	S9410-OPC	1		
C16	CAP, CER, 82 PF +/-2%, 100V	512350	89536	512350	1		
C17	CAP, CER, 27 PF +/-2%, 100V	362749	89536	362749	2		
C18	CAP, CER, 56 PF +/-2%, 100V	512970	89536	512970	1		
C19	CAP, CER, 15 PF +/-2%, 100V	369074	89536	369074	1		
C20	CAP, CER 0.22 UF +/-20%, 50V	519157	51406	RPE111Z5U224M50V	6		
C21	CAP, CER 0.22 UF +/-20%, 50V	519157	51406	RPE111Z5U224M50V	REF		
C22	CAP, CER, 0.01 UF +/-20%, 100V	407361	72982	8121-A100-W5R-103M	2		
C23	CAP, CER 0.22 UF +/-20%, 50V	519157	51406	RPE111Z5U224M50V	REF		
C24	CAP, CER 0.22 UF +/-20%, 50V	519157	51406	RPE111Z5U224M50V	REF		
C25	CAP, CER 0.22 UF +/-20%, 50V	519157	51406	RPE111Z5U224M50V	REF		
C26	CAP, CER, 0.01 UF +/-20%, 100V	407361	72982	8121-A100-W5R-103M	REF		
C27	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C28	CAP, CER 0.22 UF +/-20%, 50V	519157	51406	RPE111Z5U224M50V	REF		
C29	CAP, CER, 39 PF +/-2%, 100V	512962	89536	512962	REF		
C30	CAP, CER, 6.8 PF +/-0.25PF, 100V	512327	89536	512327	1		
C31	CAP, CER, 18 PF +/-2%, 100V	512335	89536	512335	1		
C32	CAP, CER, 27 PF +/-2%, 100V	362749	89536	362749	REF		
C33	CAP, CER, 39 PF +/-2%, 100V	512962	89536	512962	REF		
C34	CAP, CER, 68 PF +/-2%, 100V	362756	89536	362756	1		
C35	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C36	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C37	CAR, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	REF		
C38	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	REF		
C39	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	REF		
C40	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	REF		
C42	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	1		
C43	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C44	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C45	CAP, CER, 100 PF +/-2%, 100V	512848	89536	512848	2		
C46	CAP, CER, 100 PF +/-2%, 100V	512848	89536	512848	REF		
C47	CAP, CER, 33 PF +/-2%, 100V	513226	89536	513226	1		
C48	CAP, CER, 10000 PF +/-20%, 100V	407361	72982	8121-A100-W5R-103M	1		

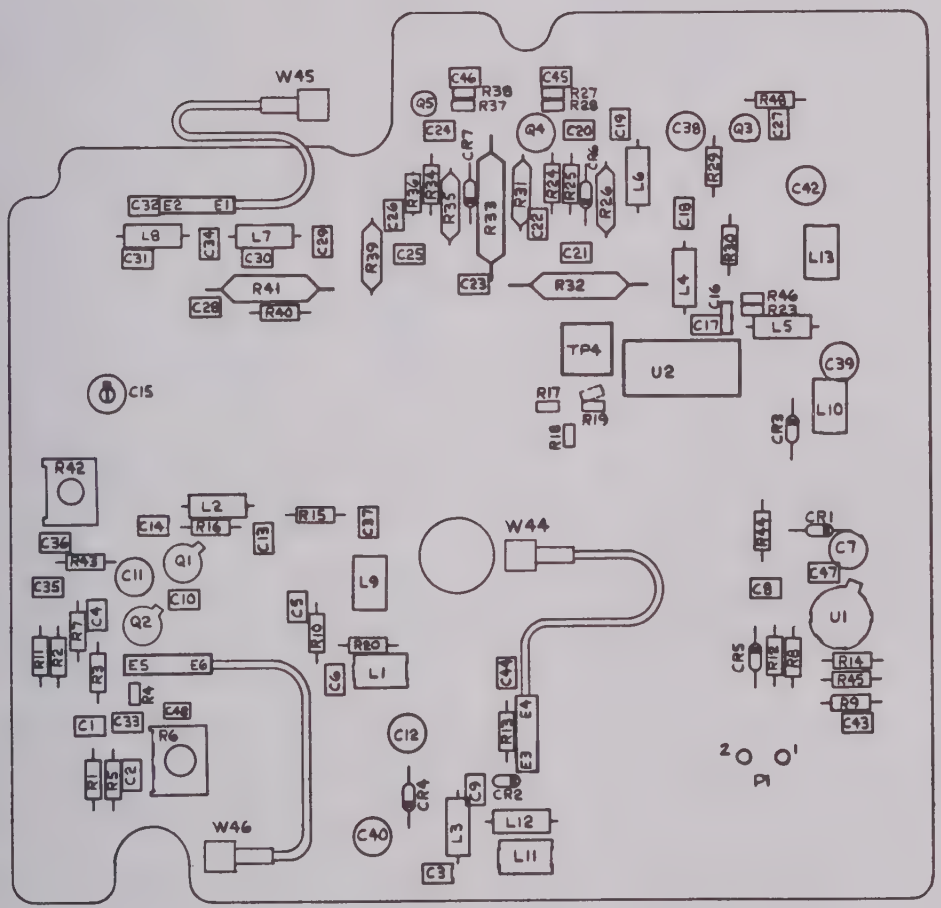
Table 6-25. A4A9 Hetrodyne Converter PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
CR1	DIODE, ZENER	454595	12969	UZ8706	3	1	
CR2	DIODE, SMALL SIGNAL	402776	28480	HP3379	1	1	
CR3	DIODE, ZENER	454595	12969	UZ8706	REF		
CR4	DIODE, ZENER	454595	12969	UZ8706	REF		
CR5	DIODE, ZENER, 3.9V +/-10%	113316	04713	1N748	1	1	
CR6	DIODE, HI-SPEED SWITCHING	203323	04713	1N4448	2	1	
CR7	DIODE, HI-SPEED SWITCHING	203323	04713	1N4448	REF		
E	TERMINATION AREAS						
L1	INDUCTOR, COIL, 6-TURN	320911	89536	320911	5		
L2	INDUCTOR, 0.47 UH +/-10%, 1060 MA	320929	24759	MR0.47	1		
L3	INDUCTOR, 0.10 UH	257154	24759	MR-0.10	4		
L4	INDUCTOR, 0.15 UH, 2600 MA	256297	24759	MR0.15	1		
L5	CHOKE, RF, 0.082 UH +/-10%	256289	89536	256289	1		
L6	INDUCTOR, 0.10 UH	257154	24759	MR-0.10	REF		
L7	INDUCTOR, 0.12 UH +/-10%, 2860 MA	272617	24759	MR0.12	1		
L8	INDUCTOR, 0.10 UH	257154	24759	MR-0.10	REF		
L9	INDUCTOR, COIL, 6-TURN	320911	89536	320911	REF		
L10	INDUCTOR, COIL, 6-TURN	320911	89536	320911	REF		
L11	INDUCTOR, COIL, 6-TURN	320911	89536	320911	REF		
L12	INDUCTOR, 0.10 UH	257154	24759	MR-0.10	REF		
L13	INDUCTOR, COIL, 6-TURN	320911	89536	320911	REF		
MP1	INSERTS, BOARD (NOT SHOWN)	376418	89536	376418	2		
MP2	LABEL, STATIC WARNING (NOT SHOWN)	960530	89536	960530	1		
MP3	SHIELD (NOT SHOWN)	463430	89536	463430	1		
MP4	SHIELD (NOT SHOWN)	463455	89536	463455	1		
MP5	SOCKET, TRANSISTOR (NOT SHOWN)	285262	71785	1-33-23-92-045	1		
P1	CONNECTOR, RECEPTACLE	544056	00779	50871-1	2		
Q1	TRANSISTOR, D-MOS	507905	18324	SD305EE	2	1	
Q2	TRANSISTOR, D-MOS	507905	18324	SD305EE	REF		
Q3	TRANSISTOR, SI, PNP	352369	12040	2N4403	1	1	
Q4	TRANSISTOR, SI, NPN	454231	04713	BFR90	1	1	
Q5	TRANSISTOR, SI, NPN, HIGH FREQUENCY	535013	04713	BFR91	1	1	
R1	RES, DEP. CAR, 27K +/-5%, 1/4W	441501	80031	CR251-4-5P27K	1		
R2	RES, DEP. CAR, 20K +/-5%, 1/4W	441477	80031	CR251-4-5P20K	1		
R3	RES, DEP. CAR, 10K +/-5%, 1/4W	148106	80031	CR251-4-5P10K	5		
R4	RES, COMP, 62 +/-10%, 1/8W	512731	01121	BB6205	1		
R5	RES, DEP. CAR, 33K +/-5%, 1/4W	348888	80031	CR251-4-5P33K	2		
R6	RES, VAR, 10K +/-10%, 1/2W	309674	75378	360T-103A	2		
R7	RES, DEP. CAR, 10K +/-5%, 1/4W	148106	80031	CR251-4-5P10K	REF		
R8	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	1		
R9	RES, DEP. CAR, 3K +/-5%, 1/4W	441527	80031	CR251-4-5P3K	2		
R10	RES, DEP. CAR, 10 +/-5%, 1/4W	340075	80031	CR251-4-5P10E	2		
R11	RES, DEP. CAR, 33K +/-5%, 1/4W	348888	80031	CR251-4-5P33K	REF		
R12	RES, DEP. CAR, 510 +/-5%, 1/4W	441600	80031	CR251-4-5P510E	1		
R13	RES, DEP. CAR, 82K +/-5%, 1/4W	348912	80031	CR251-4-5P82K	1		
R14	RES, COMP, 4.7M +/-5%, 1/4W	220046	01121	CB4755	1		
R15	RES, DEP. CAR, 10 +/-5%, 1/4W	340075	80031	CR251-4-5P10E	REF		
R16	RES, DEP. CAR, 390 +/-5%, 1/4W	147975	80031	CR251-4-5P390E	1		
R17	RES, COMP, 10 +/-10%, 1/8W	321125	01121	BB1001	2		
R18	RES, COMP, 120 +/-5%, 1/8W	513978	01121	BB1215	1		

Table 6-25. A4A9 Hetrodyne Converter PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
R19	RES, COMP, 10 +/-10%, 1/8W	321125	01121	BB1001	REF		1
R20	RES, DEP. CAR, 3.6K +/-5%, 1/4W	442343	80031	CR251-4-5P3K6	2		
R23	RES, COMP, 100 +/-10%, 1/8W	261826	01121	BB1011	2		
R24	RES, DEP. CAR, 200 +/-5%, 1/4W	441451	80031	CR251-4-5P200E	2		
R25	RES, DEP. CAR, 240 +/-5%, 1/4W	376624	80031	CR251-4-5P240E	2		
R26	RES, MTL. FILM, 4.12K +/-1%, 1/8W	235341	91637	CMF554121F	1		
R27	RES, COMP, 27 +/-10%, 1/8W	266254	01121	BB2705	4		
R28	RES, COMP, 27 +/-10%, 1/8W	266254	01121	BB2705	REF		
R29	RES, DEP. CAR, 10K +/-5%, 1/4W	148106	80031	CR251-4-5P10K	REF		
R30	RES, DEP. CAR, 3K +/-5%, 1/4W	441527	80031	CR251-4-5P3K	REF		
R31	RES, MTL. FILM, 2.37K +/-1%, 1/8W	293720	91637	CMF552371F	2		
R32	RES, MTL. FILM, 487 +/-1%, 1/2W	150797	91637	CMF654870F	1		
R33	RES, MTL. FILM, 205 +/-1%, 1/2W	513960	91637	CMF652050F	1		
R34	RES, DEP. CAR, 240 +/-5%, 1/4W	376624	80031	CR251-4-5P240E	REF		
R35	RES, MTL. FILM, 4.02K +/-1%, 1/8W	235325	91637	CMF554021F	1		
R36	RES, DEP. CAR, 200 +/-5%, 1/4W	441451	80031	CR251-4-5P200E	REF		
R37	RES, COMP, 27 +/-10%, 1/8W	266254	01121	BB2705	REF		
R38	RES, COMP, 27 +/-10%, 1/8W	266254	01121	BB2705	REF		
R39	RES, MTL. FILM, 2.37K +/-1%, 1/8W	293720	91637	CMF552371F	REF		
R40	RES, DEP. CAR, 51 +/-5%, 1/4W	414540	80031	CR251-4-5P51E	1		
R41	RES, MTL. FILM, 210, +/-1%, 1/2W	513952	91637	CMF652100F	1		
R42	RES, VAR, 10K +/-10%, 1/2W	309674	75378	360T-103A	REF		
R43	RES, DEP. CAR, 10K +/-5%, 1/4W	148106	80031	CR251-4-5P10K	REF		
R44	RES, DEP. CAR, 3.6K +/-5%, 1/4W	442343	80031	CR251-4-5P3K6	REF		
R45	RES, DEP. CAR, 560K +/-5%, 1/4W	342642	80031	CR251-4-5P560K	1		
R46	RES, COMP, 100 +/-10%, 1/8W	261826	01121	BB1011	REF		
R48	RES, DEP. CAR, 10K +/-5%, 1/4W	148106	80031	CR251-4-5P10K	REF		
TP1	CONNECTOR, TEST POINT	512889	00779	62395-1	5		
TP2	CONNECTOR, TEST POINT	512889	00779	62395-1	REF		
TP3	CONNECTOR, TEST POINT	512889	00779	62395-1	REF		
TP4	CONNECTOR, SOCKET	352450	98291	51-051-0000	1		
TP5	CONNECTOR, TEST POINT	512889	00779	62395-1	REF		
TP6	CONNECTOR, TEST POINT	512889	00779	62395-1	REF		
U1	IC, LIN, OP AMP	381889	12040	LM201AH	1	1	
U2	IC, MIXER, DOUBLE BALANCED	529917	15542	TAK-1WH	1	1	
W44	CABLE ASSEMBLY	526715	89536	526715	2		
W45	CABLE ASSEMBLY	526723	89536	526723	1		
W46	CABLE ASSEMBLY	526715	89536	526715	REF		

1 R19 RESISTOR IS ALSO USED FOR TESTING ALIGNMENT (WITH TP4). USE IN THE DOTTED POSITION FOR THIS ADJUSTMENT AS SHOWN IN FIGURE 5-25 ALSO SEE A4A9 ADJUSTMENT PROCEDURE IN THE TEXT.



6070A-1613

Figure 6-25. A4A9 Hetrodyne Converter PCB Assembly

Table 6-26. A4A10 Modulator Distribution PCB Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
A4A10⊘	MOD. DISTRIBUTION PCB ASSEMBLY FIGURE 6-26 (6070A-4014T)	463570	89536	463570	REF		
C1	CAP, TA, 47 UF +/-20%, 20V	348516	56289	196D476X0020KE4	2		
C2	CAP, TA, 47 UF +/-20%, 20V	348516	56289	196D476X0020KE4	REF		
C3	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	11		
C4	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C5	CAP, PLASTIC, 0.027 UF +/-10%, 250V	267120	73445	C280AE/A27K	1		
C6	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C7	CAP, CER, 150 PF +/-5%, 100V	512988	89536	512988	2		
C8	CAP, MYLAR, 0.01 UF +/-10%, 250V	325548	73445	C280MAE/A10K	1		
C9	CAP, CER, 750 PF +/-5%, 50V	528521	89536	528521	1		
C10	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C11	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	12		
C12	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C13	CAP, VAR, 4.5 - 50 PF 250V	321117	73899	DVJ305A	1		
C15	CAP, CER, 22 PF +/-2%, 100V	512871	89536	512871	3		
C16	CAP, CER, 10 PF +/-2%, 100V	512343	89536	512343	2		
C17	CAP, CER, 10 PF +/-2%, 100V	512343	89536	512343	REF		
C18	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C19	CAP, CER, 22 PF +/-2%, 100V	512871	89536	512871	REF		
C20	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C21	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C22	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C23	CAP, CER, 12 PF +/-2%, 100V	376871	89536	376871	1		
C24	CAP, CER, 150 PF +/-5%, 100V	512988	89536	512988	REF		
C25	CAP, CER, 22 PF +/-2%, 100V	512871	89536	512871	REF		
C26	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C27	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C28	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C29	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C30	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C31	CAP, CER, 2.2 PF +/-2%, 100V	362731	89536	362731	1		
C32	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C33	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C34	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C35	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C36	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C37	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C38	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C39	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C40	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
CR2	DIODE, SMALL SIGNAL	313247	28484	HP5082-6264	4	1	
CR3	DIODE, SMALL SIGNAL	313247	28484	HP5082-6264	REF		
CR4	DIODE, SMALL SIGNAL	313247	28484	HP5082-6264	REF		
CR5	DIODE, HI-SPEED SWITCHING	203323	07910	1N4448	3	1	
CR6	DIODE, HI-SPEED SWITCHING	203323	07910	1N4448	REF		
CR7	DIODE, HI-SPEED SWITCHING	203323	07910	1N4448	REF		
CR8	DIODE, ZENER	357848	04713	SZG20118	1	1	
CR10	DIODE, SMALL SIGNAL	313247	28484	HP5082-6264	REF		

Table 6-26. A4A10 Modulator Distribution PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
E1	BUSS WIRE, #22	115469	89536	115469	AR		
E2	BUSS WIRE, #22	115469	89536	115469	REF		
J1	SOCKET, IC, 14-PIN	276527	91507	314-AG39D	1		
J2	CONNECTOR	530261	00779	87334-4	1		
J7	CONNECTOR, POST	267500	00779	86144-2	27		
J8	CONNECTOR, POST	267500	00779	86144-2	REF		
J9	CONNECTOR, 6-PIN	512178	27264	09-80-1063	1		
J10	CONNECTOR, RF, SMB	512095	16733	702033	3		
J11	CONNECTOR, RF, SMB	512095	16733	702033	REF		
J12	CONNECTOR, RF, SMB	512095	16733	702033	REF		
K1	RELAY, SPST	461434	15636	R7254-1	3		
K2	RELAY, SPST	461434	15636	R7254-1	REF		
K3	RELAY, SPST	461434	15636	R7254-1	REF		
L1	INDUCTOR, COIL, 6-TURN	320911	89536	320911	5		
L2	INDUCTOR, COIL, 6-TURN	320911	89536	320911	REF		
L3	INDUCTOR, COIL, 6-TURN	320911	89536	320911	REF		
L4	INDUCTOR, COIL, 6-TURN	320911	89536	320911	REF		
L5	INDUCTOR, COIL, 6-TURN	320911	89536	320911	REF		
P1	COMPONENT LEAD, SPRING TYPE	544056	00779	50871-1	26		
P2	COMPONENT LEAD, SPRING TYPE	544056	00779	50871-1	REF		
P3	COMPONENT LEAD, SPRING TYPE	544056	00779	50871-1	REF		
P4	COMPONENT LEAD, SPRING TYPE	544056	00779	50871-1	REF		
P5	COMPONENT LEAD, SPRING TYPE	544056	00779	50871-1	REF		
Q1	TRANSISTOR, SI, NPN	150359	95303	2N3053	1	1	
Q3	TRANSISTOR, J-FET	413690	21845	F5488	2	1	
Q4⊗	TRANSISTOR, FIELD EFFECT	477729	18324	SD213EE	6	2	
Q5⊗	TRANSISTOR, FIELD EFFECT	477729	18324	SD213EE	REF		
Q6⊗	TRANSISTOR, FIELD EFFECT	477729	18324	SD213EE	REF		
Q7⊗	TRANSISTOR, FIELD EFFECT	477729	18324	SD213EE	REF		
Q8⊗	TRANSISTOR, FIELD EFFECT	477729	18324	SD213EE	REF		
Q10⊗	TRANSISTOR, FIELD EFFECT	477729	18324	SD213EE	REF		
Q11	TRANSISTOR, J-FET	413690	21845	F5488	REF		
R1	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	2		
R2	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R3	RES, DEP. CAR, 1.5K +/-5%, 1/4W	343418	80031	CR251-4-5P1K5	2		
R4	RES, DEP. CAR, 3.3K +/-5%, 1/4W	348813	80031	CR251-4-5P3K3	2		
R5	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	4		
R6	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R8	RES, MTL. FILM, 4.64K +/-1%, 1/8W	296020	91637	CMF554641F	1		
R9	RES, MTL. FILM, 1.82K +/-1%, 1/8W	293670	91637	CMF551821F	1		
R10	RES, MTL. FILM, 4.32K +/-1%, 1/8W	294819	91637	CMF554321F	1		
R11	RES, MTL. FILM, 1.65K +/-1%, 1/8W	293662	91637	CMF551631	1		
R12	RES, VAR, 500 +/-10%, 1/2W	325613	89536	325613	3		
R13	RES, VAR, 1K +/-10%, 1/2W	275750	11236	360T102A	2		
R14	RES, VAR, 500 +/-10%, 1/2W	325613	89536	325613	REF		
R15	RES, MTL. FILM, 845 +/-1%, 1/8W	344317	91637	CMF558450F	1		
R16	RES, MTL. FILM, 412K +/-1%, 1/8W	348409	91637	CMF554123F	1		
R17	RES, MTL. FILM, 10.0K +/-1%, 1/8W	168260	91637	CMF551002F	5		
R18	RES, MTL. FILM, 10.0K +/-1%, 1/8W	168260	91637	CMF551002F	REF		
R19	RES, MTL. FILM, 10.0K +/-1%, 1/8W	168260	91637	CMF551002F	REF		

Table 6-26. A4A10 Modulator Distribution PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
R20	RES, MTL. FILM, 634 +/-1%, 1/8W	223560	91637	CMF556340F	1		
R21	RES, MTL. FILM, 1.15K +/-1%, 1/8W	293597	91637	CMF551151F	1		
R22	RES, VAR, 500 +/-10%, 1/2W	325613	89536	325613	REF		
R23	RES, DEP. CAR, 24K +/-5%, 1/4W	442384	80031	CR251-4-5P24K	2		
R24	RES, DEP. CAR, 24K +/-5%, 1/4W	442384	80031	CR251-4-5P24K	REF		
R25	RES, COMP, 4.7K +/-5%, 1/4W	348821	01121	CB4725	1		
R26	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R27	RES, MTL. FILM, 1.69K +/-1%, 1/8W	321414	91637	CMF551691F	1		
R28	RES, DEP. CAR, 100 +/-5%, 1/4W	348771	80031	CR251-4-5P100E	2		
R29	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R30	RES, MTL. FILM, 10.0K +/-1%, 1/8W	168260	91637	CMF551002F	REF		
R31	RES, VAR, 10K, +/-10%, 1/2W	485458	32997	3299W-CR2-103	2		
R32	RES, MTL. FILM, 10.0K +/-1%, 1/8W	168260	91637	CMF551002F	REF		
R33	RES, VAR, 10K, +/-10%, 1/2W	485458	32997	3299W-CR2-103	REF		
R34	RES, MTL. FILM, 15K +/-1%, 1/8W	285296	91637	CMF551502F	1		
R35	RES, MTL. FILM, 6.34K +/-1%, 1/8W	267344	91637	CMF556341F	1		
R36	RES, DEP. CAR, 3.3K +/-5%, 1/4W	348813	80031	CR251-4-5P3K3	REF		
R37	RES, DEP. CAR, 1.5K +/-5%, 1/4W	343418	80031	CR251-4-5P1K5	REF		
R38	RES, VAR, 25K +/-10%, 1/2W	494591	11236	360T-253A	2		
R40	RES, DEP. CAR, 22K +/-5%, 1/4W	348870	80031	CR251-4-5P22K	3		
R41	RES, VAR, 100K +/-10%, 1/2W	369520	11236	360T-104A	4		
R42	RES, DEP. CAR, 56K +/-5%, 1/4W	441626	80031	CR251-4-5P56K	2		
R43	RES, VAR, 10K +/-10%, 1/2W	309674	75378	360T-103A	2		
R44	RES, VAR, 200 +/-10%, 1/2W	275743	89536	275743	1		
R45	RES, DEP. CAR, 22K +/-5%, 1/4W	348870	80031	CR251-4-5P22K	REF		
R46	RES, VAR, 100K +/-10%, 1/2W	369520	11236	360T-104A	REF		
R47	RES, MTL. FILM, 301 +/-1%, 1/8W	267740	91637	CMF553010F	1		
R48	RES, VAR, 1K +/-10%, 1/2W	275750	11236	360T102A	REF		
R49	RES, DEP. CAR, 56K +/-5%, 1/4W	441626	80031	CR251-4-5P56K	REF		
R50	RES, VAR, 10K +/-10%, 1/2W	309674	75378	360T-103A	REF		
R51	RES, MTL. FILM, 12.4K +/-1%, 1/8W	261644	91637	CMF551242F	1		
R52	RES, MTL. FILM, 4.99K +/-1%, 1/8W	168252	91637	CMF554991F	1		
R53	RES, DEP. CAR, 22K +/-5%, 1/4W	348870	80031	CR251-4-5P22K	REF		
R54	RES, VAR, 100K +/-10%, 1/2W	369520	11236	360T-104A	REF		
R55	RES, VAR, 1K +/-10%, 1/2W	393728	32997	3299W-CR2-102	1		
R56	RES, MTL. FILM, 1K +/-1%, 1/8W	168229	91637	CMF551001F	1		
R58	RES, VAR, 25K +/-10%, 1/2W	494591	11236	360T-253A	REF		
R59	RES, DEP. CAR, 100 +/-5%, 1/4W	348771	80031	CR251-4-5P100E	REF		
R60	RES, COMP, 10M +/-5%, 1/4W	194944	01121	CB1065	1		
R61	RES, VAR, 100K +/-10%, 1/2W	369520	11236	360T-104A	REF		
TP1-TP12	CONNECTOR, TEST POINT	512889	00779	62395-1	12		
U1⊗	IC, LINEAR, D-MOS FET QUAD ANALOG	507228	18324	SD50021J	2	1	
U2	IC, LINEAR, QUAD COMPARATOR	387233	12040	LM339N	3	1	
U3	RESISTOR NETWORK	412924	89536	412924	2	1	
U4	IC, 8-BIT ADDRESSABLE LATCH	419242	01295	SN74LS259N	10	2	
U5	IC, 8-BIT ADDRESSABLE LATCH	419242	01295	SN74LS259N	REF		
U6	IC, TTL, HEX INVERTER	393058	01295	SN74LS04N	1	1	
U7	IC, 8-BIT ADDRESSABLE LATCH	419242	01295	SN74LS259N	REF		
U8	IC, 8-BIT ADDRESSABLE LATCH	419242	01295	SN74LS259N	REF		
U9	IC, LO-PWR, SCHOTTKY TRI-ST OCTAL, BFR.	429902	12040	DM81LS95N	3	1	

Table 6-26. A4A10 Modulator Distribution PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
U10	IC, TTL, HEX, INVERTER	407593	01295	SN7406N	1	1	
U11	IC, LO-PWR, SCHOTTKY TRI-ST OCTAL, BFR.	429902	12040	DM81LS95N	REF		
U12⊘	IC, C-MOS, 10-BIT D/A CONVERTER	507558	24355	AD7533KN	1	1	
U14	IC, 8-BIT ADDRESSABLE LATCH	419242	01295	SN74LS259N	REF		
U15	IC, 8-BIT ADDRESSABLE LATCH	419242	01295	SN74LS259N	REF		
U16	IC, 8-BIT ADDRESSABLE LATCH	419242	01295	SN74LS259N	REF		
U17	IC, LO-PWR, SCHOTTKY TRI-ST OCTAL, BFR.	429902	12040	DM81LS95N	REF		
U18	IC, LINEAR, OP-AMP	495051	18324	NE5534N	2	1	
U19	IC, LINEAR, OP-AMP, J-FET INPUT	483438	89536	483438	1	1	
U20	IC, 8-BIT ADDRESSABLE LATCH	419242	01295	SN74LS259N	REF		
U21	IC, 8-BIT ADDRESSABLE LATCH	419242	01295	SN74LS259N	REF		
U22	IC, TTL, LO-PWR SCHOTTKY HEX/QUADRUPLE	393215	01295	SN74LS175N	1	1	
U23	IC, LINEAR, OP-AMP	495051	18324	NE5534N	REF		
U24	RESISTOR NETWORK	501841	89536	501841	1	1	
U25⊘	IC, C-MOS, 10-BIT D/A CONVERTER	507566	24355	AD7533LN	2	1	
U26	IC, OP-AMP, LO-NOISE	477745	18324	NE5534AN	1	1	
U27⊘	IC, C-MOS, 10-BIT D/A CONVERTER	507566	24355	AD7533LN	REF		
U28	IC, LINEAR, OP-AMP	472779	12040	LF386N	2	1	
U29⊘	IC, C-MOS, BIT MULTIPLY DA CONVERTERS	472753	24355	AD7531KN	1	1	
U30	IC, LINEAR, OP-AMP	472779	12040	LF386N	REF		
U33⊘	IC, LINEAR, D-MOS FET QUAD ANALOG	507228	18324	SD50021J	REF		
U34	RESISTOR NETWORK	412924	89536	412924	REF		
U35	IC, LINEAR, QUAD COMPARATOR	387233	12040	LM339N	REF		
U36	IC, TTL, QUAD, 2-INPUT, POS NAND GATE	393033	01295	SN74LS00N	1	1	
U37	IC, LINEAR, QUAD COMPARATOR	387233	12040	LM339N	REF		
U38	IC, 8-BIT ADDRESSABLE LATCH	419242	01295	SN74LS259N	REF		
U39	IC, TTL, LO-PWR, 3-8 LINE DECODER	407585	01295	SN74LS138N	2	1	
U40	IC, TTL, LO-PWR, 3-8 LINE DECODER	407585	01295	SN74LS138N	REF		
U41	IC, HYBRID	481630	89536	481630	1	1	
XQ1	SPACER, TRANSISTOR	152207	07047	10123-DAP	1		
XU1	SOCKET, IC, 16-PIN	276535	91506	316-AG39D	19		
XU2	SOCKET, IC, 14-PIN	276527	91507	314-AG39D	7		
XU4	SOCKET, IC, 16-PIN	276535	91506	316-AG39D	REF		
XU5	SOCKET, IC, 16-PIN	276535	91506	316-AG39D	REF		
XU6	SOCKET, IC, 14-PIN	276527	91507	314-AG39D	REF		
XU7	SOCKET, IC, 16-PIN	276535	91506	316-AG39D	REF		
XU8	SOCKET, IC, 16-PIN	276535	91506	316-AG39D	REF		
XU9	SOCKET, IC, 20-PIN	454421	01295	C932002	3		
XU10	SOCKET, IC, 14-PIN	276527	91507	314-AG39D	REF		
XU11	SOCKET, IC, 20-PIN	454421	01295	C932002	REF		
XU12	SOCKET, IC, 16-PIN	276535	91506	316-AG39D	REF		
XU14	SOCKET, IC, 16-PIN	276535	91506	316-AG39D	REF		
XU15	SOCKET, IC, 16-PIN	276535	91506	316-AG39D	REF		
XU16	SOCKET, IC, 16-PIN	276535	91506	316-AG39D	REF		
XU17	SOCKET, IC, 20-PIN	454421	01295	C932002	REF		
XU18	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	5		
XU19	SOCKET, IC, 14-PIN	276527	91507	314-AG39D	REF		
XU20	SOCKET, IC, 16-PIN	276535	91506	316-AG39D	REF		
XU21	SOCKET, IC, 16-PIN	276535	91506	316-AG39D	REF		
XU22	SOCKET, IC, 16-PIN	276535	91506	316-AG39D	REF		

Table 6-26. A4A10 Modulator Distribution PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
XU23	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	REF		
XU24	SOCKET, IC, 16-PIN	276535	91506	316-AG39D	REF		
XU25	SOCKET, IC, 16-PIN	276535	91506	316-AG39D	REF		
XU26	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	REF		
XU27	SOCKET, IC, 16-PIN	276535	91506	316-AG39D	REF		
XU28	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	REF		
XU29	SOCKET, IC, 18-PIN	418228	91506	318-AG39D	1		
XU30	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	REF		
XU35	SOCKET, IC, 14-PIN	276527	91507	314-AG39D	REF		
XU36	SOCKET, IC, 14-PIN	276527	91507	314-AG39D	REF		
XU37	SOCKET, IC, 14-PIN	276527	91507	314-AG39D	REF		
XU38	SOCKET, IC, 16-PIN	276535	91506	316-AG39D	REF		
XU39	SOCKET, IC, 16-PIN	276535	91506	316-AG39D	REF		
XU40	SOCKET, IC, 16-PIN	276535	91506	316-AG39D	REF		

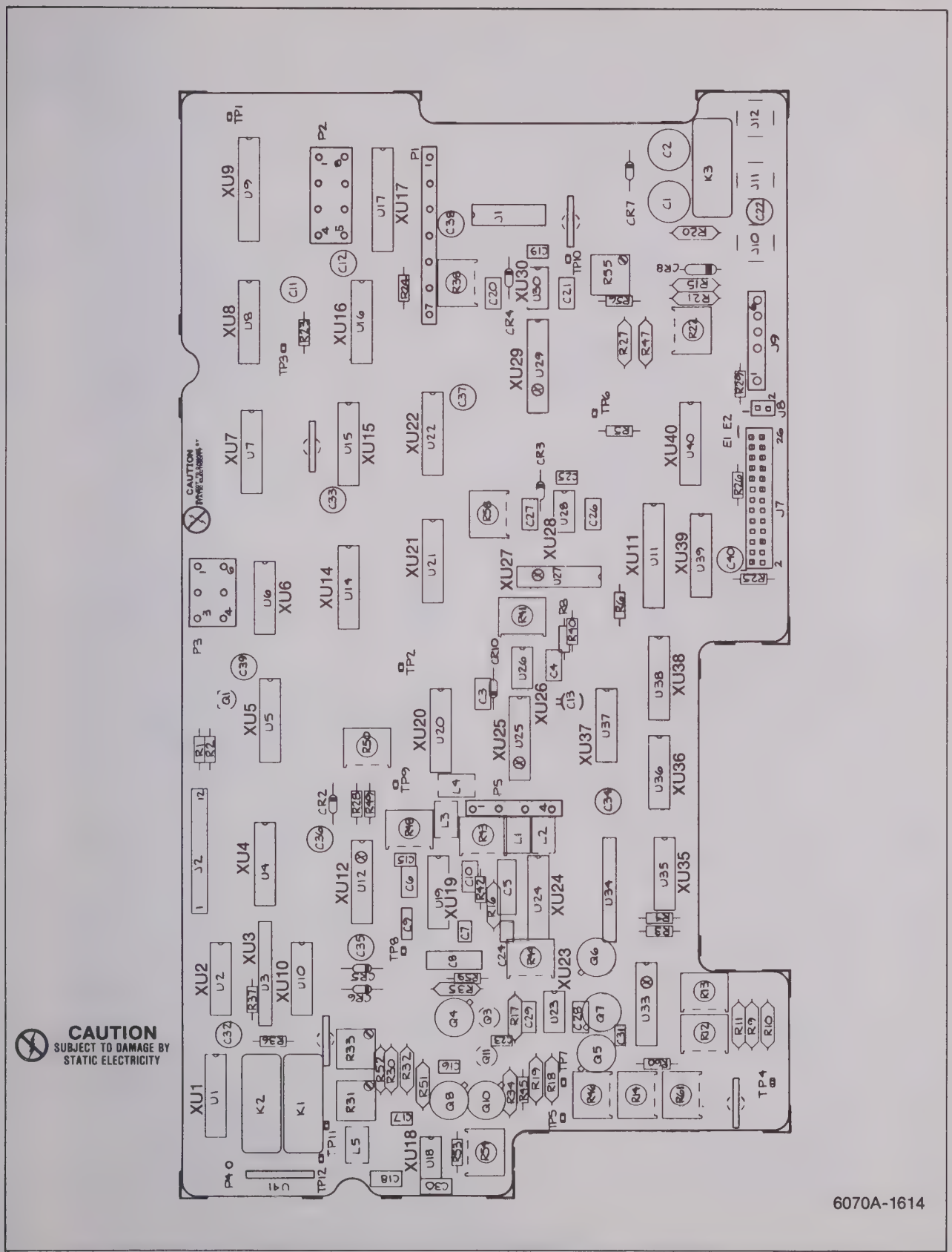


Figure 6-26. A4A10 Modulator Distribution PCB Assembly

Table 6-27. A5 Power Supply Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
A5⊗	POWER SUPPLY ASSEMBLY, REAR PANEL FIGURE 6-27 (6070A-4203T)				REF		1
A5A1	POWER SUPPLY PCB ASSEMBLY	462416	89536	462416	1		
A5A2⊗	P/S REGULATOR PCB ASSEMBLY	462408	89536	462408	1		
A5A3	AUXILIARY TRANSFORMER PCB ASSEMBLY	489005	89536	489005	1		
A5A4	INPUT RECTIFIER PCB ASSEMBLY	489013	89536	489013	1		
A5A5	SWITCHING TRANSISTORS ASSEMBLY	521385	89536	521385	1		
A5A6	POWER SUPPLY CAPACITOR PCB ASSEMBLY	520957	89536	520957	1		
A5A7	HEATSINK PLATE ASSEMBLY				1		
	(NO PARTS LIST BREAKDOWN LISTED)						
A6	POWER SUPPLY ASSEMBLY, REAR PANEL CONTINUED	SEE A6 SECTION, FOLLOWING A5A6.					
C1	CAP, FEED THRU, 2500 PF GMV, 500V	248286	72982	2499-003X5U-252AA	11		
C2	CAP, FEED THRU, 2500 PF GMV, 500V	248286	72982	2499-003X5U-252AA	REF		
C3	CAP, FEED THRU, 2500 PF GMV, 500V	248286	72982	2499-003X5U-252AA	REF		
C4	CAP, FEED THRU, 2500 PF GMV, 500V	248286	72982	2499-003X5U-252AA	REF		
C5	CAP, FEED THRU, 2500 PF GMV, 500V	248286	72982	2499-003X5U-252AA	REF		
C6	CAP, FEED THRU, 2500 PF GMV, 500V	248286	72982	2499-003X5U-252AA	REF		
C7	CAP, FEED THRU, 2500 PF GMV, 500V	248286	72982	2499-003X5U-252AA	REF		
C8	CAP, FEED THRU, 2500 PF GMV, 500V	248286	72982	2499-003X5U-252AA	REF		
C9	CAP, FEED THRU, 2500 PF GMV, 500V	248286	72982	2499-003X5U-252AA	REF		
C10	CAP, FEED THRU, 2500 PF GMV, 500V	248286	72982	2499-003X5U-252AA	REF		
C11	CAP, FEED THRU, 2500 PF GMV, 500V	248286	72982	2499-003X5U-252AA	REF		
C101	CAP, CER, 0.010 UF -20/+80%, 250VAC	520254	89536	520254	1		
CR13	DIODE, POWER	508242	84411	1N6096	2	1	
CR14	DIODE, POWER	508242	84411	1N6096	REF		
F101	FUSE, FAST ACTING, 4 AMP	216846	71400	AGC4A250V	1	5	
H1	NUT, 6-32	110569	89536	110569	3		
H2	NUT, #10	110536	89536	110536	2		
H3	SCREW, PHP, 4-40 X 3/16	149567	89536	149567	2		
H4	SCREW, SELF-LOCKING, 4-40 X 1/4	185918	89536	185918	17		
H5	SCREW, CAP, BLACK, 4-40 X 1/4	528299	89536	528299	2		
H6	SCREW, SELF-LOCKING, 4-40 X 3/8	281196	89536	281196	4		
H7	SCREW, SELF-LOCKING, 4-40 X 1/2	353060	89536	353060	6		
H8	SCREW, PHP, 4-40 X 3/4	152132	89536	152132	1		
H9	SCREW, PHP, 4-40 X 1 3/4	136689	89536	136689	2		
H10	SCREW, SELF-LOCKING, 6-32 X 3/8	177022	89536	177022	6		
H11	SCREW, CAP, BLACK, 6-32 X 1/2	542761	89536	542761	11		
H12	WASHER, FLAT	146225	89536	146225	1		
H13	WASHER, LOCK	111096	89536	111096	1		
H14	WASHER, MICA	195289	89536	195289	4		
H15	WASHER, STAR	175943	89536	175943	1		

Table 6-27. A5 Power Supply Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
H16	WASHER, LOCK, #4	110395	89536	110395	5		
H17	WASHER, LOCK, #6	110692	89536	110692	3		
H18	WASHER, FLAT, #10	110262	89536	110262	2		
L101	INDUCTOR, 18 UH	492090	89536	492090	1		
L102	LINE FILTER	500405	89536	500405	1		
MP1	BRACKET, PCB MOUNTING, BOTTOM	488171	89536	488171	1		
MP2	BRACKET, PCB MOUNTING, TOP	488189	89536	488189	1		
MP3	BUSHING, TEFLON	187989	89536	187989	2		
MP4	CAN, CAPACITOR	515502	89536	515502	1		
MP5	FUSEHOLDER	460329	89536	460329	1		
MP6	FUSEHOLDER CAP	460238	89536	460238	1		
MP7	GASKET, LINE CONNECTOR	577189	89536	577189	1		
MP8	HEATSINK, PAINTED	542035	89536	542035	1		
MP9	SOLDER LUG	237180	89536	237180	2		
MP10	SOLDER LUG, #4	102558	89536	102588	1		
R101	RES, DEP. CAR, 56 +/-5%, 1/4W	342618	80031	CR251-4-5P56E	1		
R102	RES, DEP. CAR, 100 +/-5%, 1/4W	348771	80031	CR251-4-5P100E	1		
S101	SWITCH, 115/230	283952	89536	283952	1	1	
S102	SWITCH, TOGGLE	524207	89536	524207	1	1	
W60	CABLE ASSEMBLY	544973	89536	544973	1		
W61	CABLE ASSEMBLY	544981	89536	544981	1		
W62	CABLE ASSEMBLY	512377	89536	512377	1		
W64	CABLE ASSEMBLY	583484	89536	583484	1		
W70	CABLE ASSEMBLY	521369	89536	521369	1		
W110	CABLE ASSEMBLY	515254	89536	515254	1		
W111	CABLE ASSEMBLY	510123	89536	510123	1		

1 A6 ASSEMBLIES, SEE FOLLOWING A5 SECTION. A5 AND A6 ASSEMBLIES ARE COMBINED AS THE POWER SUPPLY REAR PANEL ASSEMBLY.

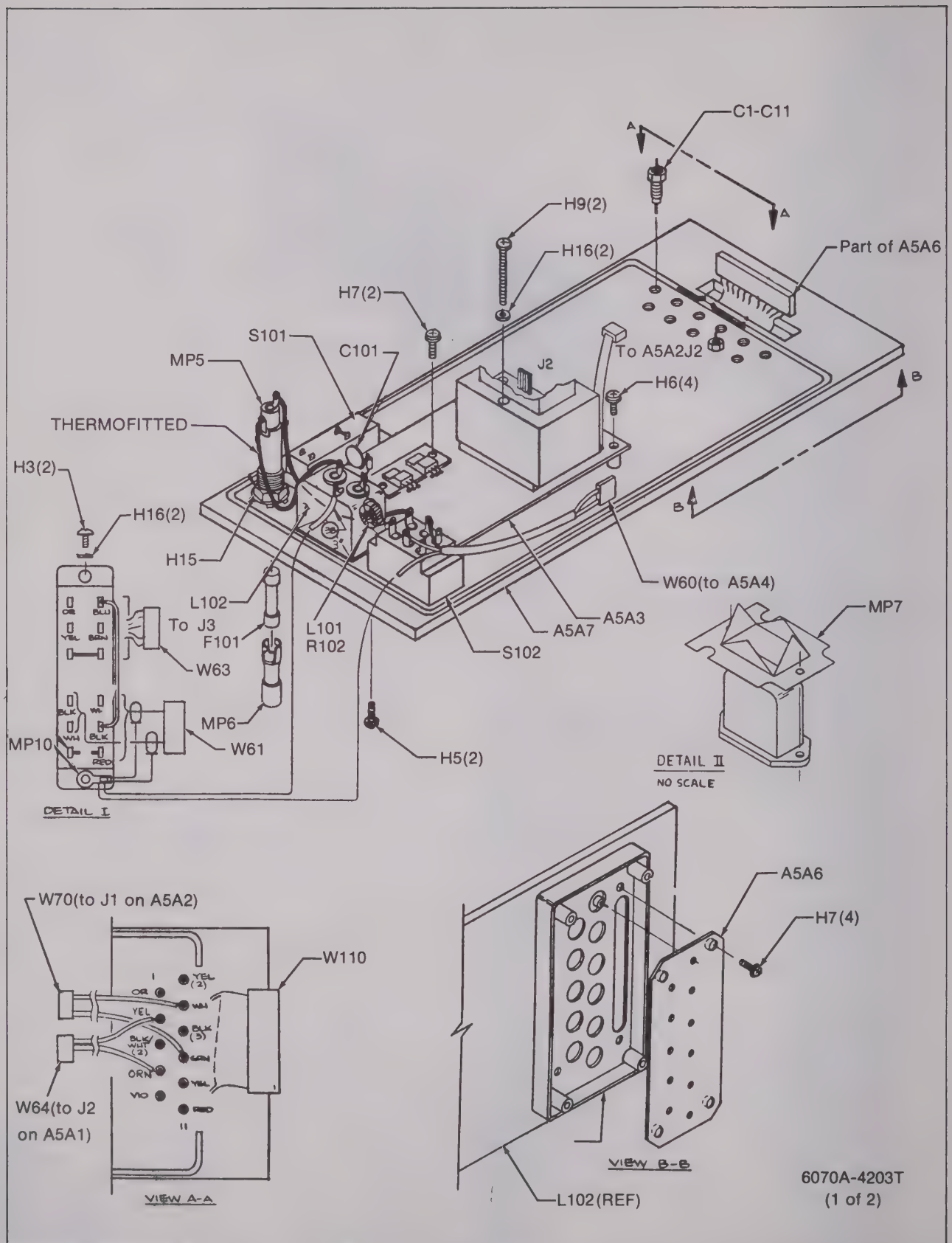


Figure 6-27. A5 Power Supply Assembly

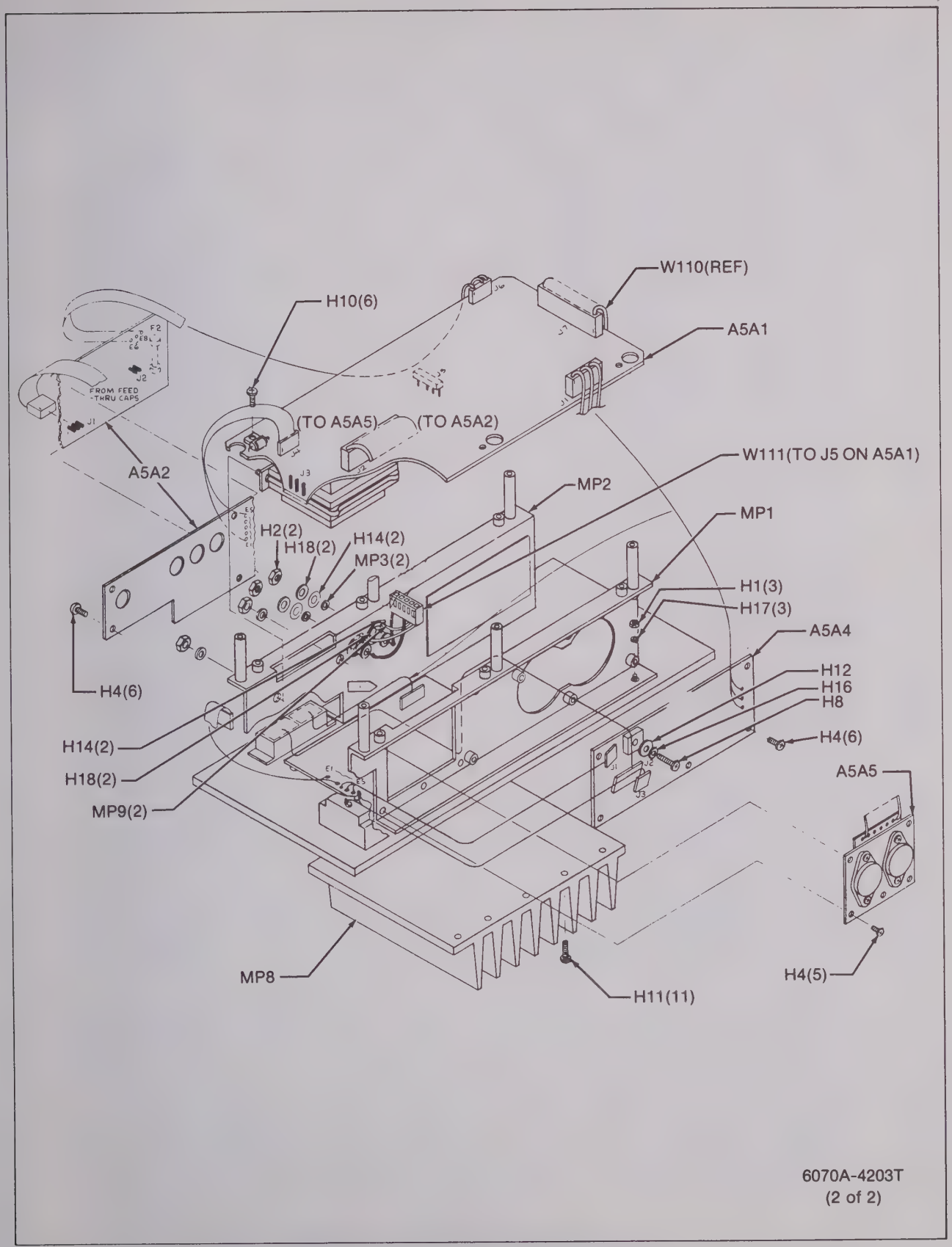


Figure 6-27. A5 Power Supply Assembly (cont)

Table 6-28. A5A1 Power Supply PCB Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
A5A1	POWER SUPPLY PCB ASSEMBLY FIGURE 6-28 (6070A-4003T)	462416	89536	462416	REF		
C1	CAP, DISC, 5000 PF +/-20%, 3000V	485839	89536	485839	3		
C2	CAP, DISC, 5000 PF +/-20%, 3000V	485839	89536	485839	REF		
C3	CAP, DISC, 5000 PF +/-20%, 3000V	485839	89536	485839	REF		
C4	CAP, POLY, 1.0 UF +/-10%, 400V	500413	84411	TRW-35-1.0-10P-400V	3		
C5	CAP, POLY, 1.0 UF +/-10%, 400V	500413	84411	TRW-35-1.0-10P-400V	REF		
C6	CAP, POLY, 1.0 UF +/-10%, 400V	500413	84411	TRW-35-1.0-10P-400V	REF		
C7	CAP, MICA, 510 PF +/-5%, 500V	148411	72136	DM19E511J	1		
C8	CAP, ELECT. TA, 33 UF +/-10%, 10V	182832	56289	150D336X9010B2	2		
C9	CAP, ELECT. TA, 33 UF +/-10%, 10V	182832	56289	150D336X9010B2	REF		
C12	CAP, ELECT, 47 UF +/-20%, 35V	501262	90201	THF47G35	1		
C15	CAP, ELECT, 150 UF +/-20%, 15V	501270	90201	THF150G15	2		
C16	CAP, ELECT, 150 UF +/-20%, 15V	501270	90201	THF150G15	REF		
C17	CAP, TUBULAR, 330 UF +/-20%, 6V	501288	90201	THF330G6	1		
C18	CAP, TA, 22 UF +/-20%, 15V	423012	56289	196D226X0015KA1	1		
C19	CAP, CER, 0.05 UF +/-20%, 50V	175232	56289	C023B101H253M	2		
C20	CAP, CER, 0.05 UF +/-20%, 50V	175232	56289	C023B101H253M	REF		
C21	CAP, TA, 2.2 UF +/-20%, 20V	161927	56289	196D2225X0020HA1	1		
C22	CAP, CER, 39 PF +/-5%, 1000V	417410	72982	858-000-R2G0-390J	1		
C23	CAP, CER, 300 PF +/-10%, 100V	105734	71590	BB60301KW7W	1		
CR2	DIODE, SI, RECTIFIER, 1 AMP	379412	04713	1N4933	8	2	
CR3	DIODE, SI, RECTIFIER, 1 AMP	379412	04713	1N4933	REF		
CR4	DIODE, SI, RECTIFIER, 1A, 100V	343491	03877	1N4002	2	1	
CR5	DIODE, SI, RECTIFIER, 1A, 100V	343491	03877	1N4002	REF		
CR6	DIODE, SI, HI-SPEED SWITCHING	203323	07910	1N4448	2	1	
CR7	DIODE, SI, FAST RECOVERY	523720	12969	UES1303	2	1	
CR8	DIODE, SI, FAST RECOVERY	523720	12969	UES1303	REF		
CR9	DIODE, SI, RECTIFIER	483701	14099	5FF10	2	1	
CR10	DIODE, SI, RECTIFIER	483701	14099	5FF10	REF		
CR11	RECTIFIER, SI, FAST RECOVERY, 100V	495739	14099	3FF10	2	1	
CR12	RECTIFIER, SI, FAST RECOVERY, 100V	495739	14099	3FF10	REF		
CR15	DIODE, SI, HI-SPEED SWITCHING	203323	07910	1N4448	REF		
CR16	DIODE, SI, RECTIFIER, 1 AMP	379412	04713	1N4933	REF		
CR17	DIODE, SI, RECTIFIER, 1 AMP	379412	04713	1N4933	REF		
CR18	DIODE, SI, RECTIFIER, 1 AMP	379412	04713	1N4933	REF		
CR19	DIODE, SI, RECTIFIER, 1 AMP	379412	04713	1N4933	REF		
CR20	DIODE, SI, RECTIFIER, 1 AMP	379412	04713	1N4933	REF		
CR21	DIODE, SI, RECTIFIER, 1 AMP	379412	04713	1N4933	REF		
DS1	LAMP, NEON	100347	74276	T2-24-2	1		
H1	P-NUT, 4-40 (NOT SHOWN)	380196	24347	KF2-440	3		
H2	SCREW, 4-40 X 1 1/4 (NOT SHOWN)	114918	89536	114918	3		
H3	WASHER, FLAT (NOT SHOWN)	146225	89536	146225	3		
H4	WASHER, FLAT, TEFLON (NOT SHOWN)	156299	89536	156299	2		
H5	WASHER, LOCK, #4 (NOT SHOWN)	110395	89536	110395	3		
J1	CONNECTOR, 6-PIN	512178	27264	09-80-1063	1		
J2	CONNECTOR, 12-PIN	512160	27264	09-80-1123	2		
J3	CONNECTOR, POST	267500	00779	86144-2	11		
J4	CONNECTOR, POST	267500	00779	86144-2	REF		

Table 6-28. A5A1 Power Supply PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
J5	CONNECTOR, 5-PIN	512186	27264	09-80-1053	1		
J6	CONNECTOR, POST	267500	00779	86144-2	REF		
J7	CONNECTOR, 12-PIN	512160	27264	09-80-1123	REF		
L1	CHOKE, 9.4 MH	492124	89536	492124	1		
L3	CHOKE, 0.516 MH	521880	89536	521880	1		
L4	CHOKE, 0.200 MH	492116	89536	492116	1		
L5	CHOKE, 170 UH	503177	89536	503177	2		
L6	CHOKE, 0.200 MH	492140	89536	492140	1		
L7	CHOKE, 170 UH	503177	89536	503177	REF		
L8	CHOKE, 80 UH	503169	89536	503169	1		
L9	CHOKE, 0.100 MH	492132	89536	492132	1		
Q3	TRANSISTOR, SI, NPN, POWER	535468	89536	535468	2	1	
Q4	TRANSISTOR, SI, NPN, POWER	535468	89536	535468	REF		
Q5	TRANSISTOR, POWER, PNP	495689	04713	MPSU56	2	1	
Q6	TRANSISTOR, POWER, PNP	495689	04713	MPSU56	REF		
R1	RES, DEP. CAR, 470K +/-5%, 1/4W	342634	80031	CR251-4-5P470K	1		
R2	RES, DEP. CAR, 15K +/-5%, 1/4W	348854	80031	CR251-4-5P15K	1		
R3	RES, COMP, 82 +/-5%, 4W	501296	89536	501296	1		
R4	RES, DEP. CAR, 24 +/-5%, 1/4W	442210	80031	CR251-4-5P24E	2		
R5	RES, CAR. DEP, 15 +/-5%, 1/4W	348755	80031	CR251-4-5P15E	2		
R6	RES, COMP, 6.2 +/-10%, 1/2W	218750	01121	EB6225	2		
R7	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	4		
R8	RES, DEP. CAR, 24 +/-5%, 1/4W	442210	80031	CR251-4-5P24E	REF		
R9	RES, CAR. DEP, 15 +/-5%, 1/4W	348755	80031	CR251-4-5P15E	REF		
R10	RES, COMP, 6.2 +/-10%, 1/2W	218750	01121	EB6225	REF		
R11	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R12	RES, DEP. CAR, 270 +/-5%, 1/4W	348789	80031	CR251-4-5P270E	2		
R17	RES, DEP. CAR, 10 +/-5%, 1/4W	340075	80031	CR251-4-5P10E	2		
R18	RES, DEP. CAR, 10 +/-5%, 1/4W	340075	80031	CR251-4-5P10E	REF		
R19	RES, COMP, 4.7K +/-5%, 1/4W	348821	01121	CB4725	1		
R20	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R21	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R22	RES, DEP. CAR, 270 +/-5%, 1/4W	348789	80031	CR251-4-5P270E	REF		
R23	RES, DEP. CAR, 33 +/-5%, 1/4W	414524	80031	CR251-4-5P33E	1		
R24	RES, COMP, 39 +/-10%, 1/2W	160036	01121	EB3901	1		
R25	RES, DEP. CAR, 100 +/-5%, 1/4W	348771	80031	CR251-4-5P100E	2		
R26	RES, DEP. CAR, 100 +/-5%, 1/4W	348771	80031	CR251-4-5P100E	REF		
T1	TRANSFORMER	611582	89536	611582	2		
T2	TRANSFORMER	611582	89536	611582	REF		
T3	TRANSFORMER, 90-264V	492199	89536	492199	1		
T4	TRANSFORMER	503185	89536	503185	1		
TP1-11	CONNECTOR, TEST POINT	512889	02660	62395-1834	11		

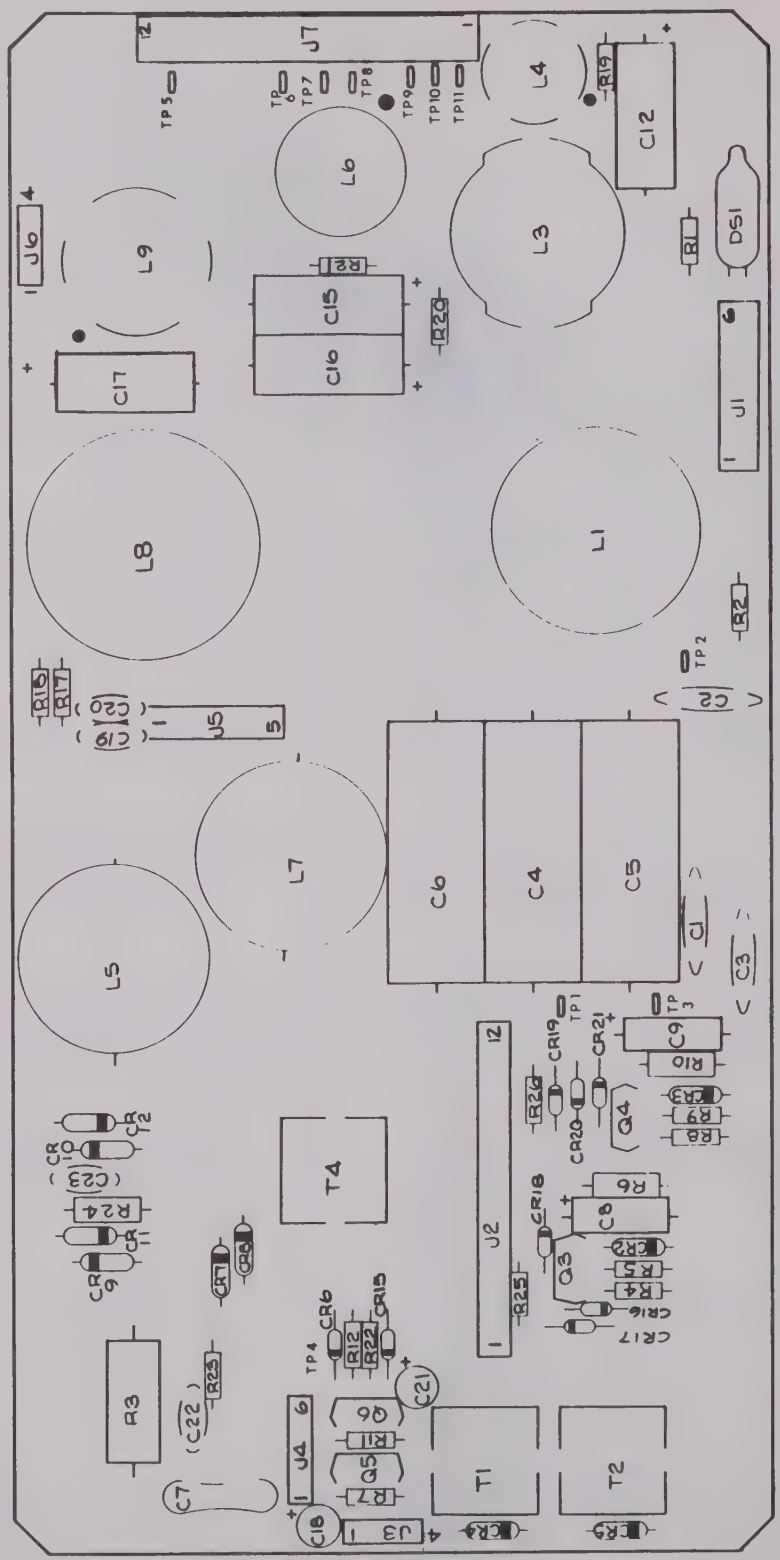


Figure 6-28. A5A1 Power Supply PCB Assembly

Table 6-29. A5A2 P/S Regulator PCB Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
A5A2⊗	P/S REGULATOR PCB ASSEMBLY FIGURE 6-29 (6070A-4002T)	462408	89536	462408	REF		
C1	CAP, ELECT, 1000 UF -10/+50%, 16V	193896	80031	ET102X016A02	1		
C4	CAP, POLY, 400 PF +/-1%, 63V	528406	12954	B31063/400/1/63	2		
C5	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	4		
C6	CAP, POLY, 3600 PF +/-2%, 63V	528414	12954	B31063/3600/2/63	2		
C7	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C8	CAP, POLY, 3600 PF +/-2%, 63V	528414	12954	B31063/3600/2/63	REF		
C9	CAP, POLY, 7500 PF +/-5%, 63V	528430	12954	B31063/7500/5/63	2		
C10	CAP, POLY, 400 PF +/-1%, 63V	528406	12954	B31063/400/1/63	REF		
C11	CAP, POLY, 7500 PF +/-5%, 63V	528430	12954	B31063/7500/5/63	REF		
C12	CAP, POLY, 5000 PF +/-5%, 63V	528422	12954	B31063/5000/5/63	1		
C13	CAP, POLY, 10000 PF +/-5%, 63V	528448	12954	B31063/10000/5/63	1		
C14	CAP, TA, 22 UF +/-20%, 15V	423012	56289	196D226X0015KA1	1		
C15	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C16	CAP, TA, 150 UF +/-20%, 20V	422576	56289	196D157X0020TA1	1		
C17	CAP, TA, 10 UF +/-20%, 15V	193623	56289	196D106X0015A1	REF		
C18	CAP, TA, 2.2 UF +/-20%, 20V	161927	56289	196D2225X0020HA1	1		
CR3	DIODE, SI	343491	04713	1N4002	2	1	
CR4	DIODE, SI, HI-SPEED SWITCHING	203323	07910	1N4448	6	2	
CR5	DIODE, SI, HI-SPEED SWITCHING	203323	07910	1N4448	REF		
CR6	DIODE, SI, HI-SPEED SWITCHING	203323	07910	1N4448	REF		
CR7	DIODE, SI, HI-SPEED SWITCHING	203323	07910	1N4448	REF		
CR8	DIODE, SI, HI-SPEED SWITCHING	203323	07910	1N4448	REF		
CR9	DIODE, ZENER 6.8V +/-5%	260695	04713	1N754A	1	1	
CR10	DIODE, ZENER 5.6V	277236	07910	1N752A	1	1	
CR11	DIODE, SI	343491	04713	1N4002	REF		
CR12	DIODE, SI, HI-SPEED SWITCHING	203323	07910	1N4448	REF		
F2	FUSE, SLO-BLO, 0.60A	544262	71400	MDL.600A	1	5	
J1	CONNECTOR, POST	267500	00779	86144-2	5		
J2	CONNECTOR, POST	267500	00779	86144-2	REF		
L1	CHOKE, 6-TURN	320911	89536	320911	2		
L2	INDUCTOR, 1500 UH +/-10%	343863	24759	MR-1500	1		
L3	CHOKE, RF, 470 UH	147827	72259	WEE470	2		
L4	CHOKE, RF, 470 UH	147827	72259	WEE470	REF		
L5	CHOKE, RF, 390 UH +/-5%, 230MA	186288	72259	WEE390	1		
L6	INDUCTOR, 1000 UH +/-10%, 40MA	256107	24759	MR-1000	1		
L7	CHOKE, 6-TURN	320911	89536	320911	REF		
MP1	FUSE CLIP	284984	84614	3621-2	2		
Q1	TRANSISTOR, SI, PNP	418707	04713	MPS56562	1		
Q2	TRANSISTOR, SI, NPN	218081	04713	MPS6520	1		
R1	RES, VAR, 10K +/-10%, 1/2W	309674	75378	360T-103A	2		
R2	RES, MTL. FILM, 17.4K +/-1%, 1/8W	236802	91637	CMF551742F	1		
R3	RES, MTL. FILM, 12.1K +/-1%, 1/8W	234997	91637	CMF551212F	1		
R4	RES, MTL. FILM, 7.50K +/-1%, 1/8W	223529	91637	CMF557501F	1		
R5	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	1		
R6	RES, MTL. FILM, 5.11K +/-1%, 1/4W	294868	91637	CMF555111F	1		
R7	RES, VAR, 10K +/-10%, 1/2W	309674	75378	360T-103A	REF		

Table 6-29. A5A2 P/S Regulator PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
R8	RES, MTL. FILM, 15K +/-1%, 1/8W	285296	91637	CMF551502F	1		
R9	RES, DEP. CAR, 11K +/-5%, 1/4W	441360	80031	CR251-4-5P11K	2		
R10	RES, DEP. CAR, 11K +/-5%, 1/4W	441360	80031	CR251-4-5P11K	REF		
R11	RES, DEP. CAR, 390 +/-5%, 1/4W	441543	80031	CR251-4-5P390E	2		
R12	RES, DEP. CAR, 390 +/-5%, 1/4W	441543	80031	CR251-4-5P390E	REF		
R13	RES, DEP. CAR, 75K +/-5%, 1/4W	394130	80031	CR251-4-5P75K	1		
R14	RES, COMP, 100K +/-5%, 1/4W	348920	01121	CB1045	2		
R15	RES, DEP. CAR, 47K +/-5%, 1/4W	348896	80031	CR251-4-5P47K	1		
R16	RES, COMP, 100K +/-5%, 1/4W	348920	01121	CB1045	REF		
R17	RES, DEP. CAR, 36K +/-5%, 1/4W	442392	80031	CR251-4-5P36K	1		
R18	RES, DEP. CAR, 30K +/-5%, 1/4W	368753	80031	CR251-4-5P30K	1		
R19	RES, DEP. CAR, 2K +/-5%, 1/4W	441469	80031	CR251-4-5P2K	2		
R20	RES, DEP. CAR, 2.2K +/-5%, 1/4W	343400	80031	CR251-4-5P2K2	1		
R21	RES, MTL. FILM, 4.32K +/-1%, 1/8W	294819	91637	CMF554321F	1		
R22	RES, DEP. CAR, 2K +/-5%, 1/4W	441469	80031	CR251-4-5P2K	REF		
R23	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	1		
R24	RES, DEP. CAR, 20K +/-5%, 1/4W	441477	80031	CR251-4-5P20K	1		
R25	RES, DEP. CAR, 200 +/-5%, 1/4W	441451	80031	CR251-4-5P200E	1		
R26	RES, MTL. FILM, 6.34K +/-1%, 1/8W	267344	91637	CMF556341F	1		
TP1	CONNECTOR, TEST POINT	512889	89536	512889	4		
TP2	CONNECTOR, TEST POINT	512889	89536	512889	REF		
TP3	CONNECTOR, TEST POINT	512889	89536	512889	REF		
TP4	CONNECTOR, TEST POINT	512889	89536	512889	REF		
U1	IC, SWITCHING VOLTAGE REGULATOR	504340	04713	MC3420P	1	1	
U2	IC, LINEAR, OP-AMP	413740	12040	LM307N	1	1	
U3Ⓧ	IC, C-MOS, RETRIGGER/RESET MULTIVIBRATOR	393512	02735	CD4098AE	1	1	
U4	IC, LINEAR, COMPARATOR	352195	01295	SN72311P	1	1	
W68	CABLE ASSEMBLY	521344	89536	521344	1		
W69	CABLE ASSEMBLY	514794	89536	514794	1		
XU1	SOCKET, IC, 16-PIN DIP	370312	91506	316-AG39D	2		
XU2	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	2		
XU3	SOCKET, IC, 16-PIN DIP	370312	91506	316-AG39D	REF		
XU4	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	REF		

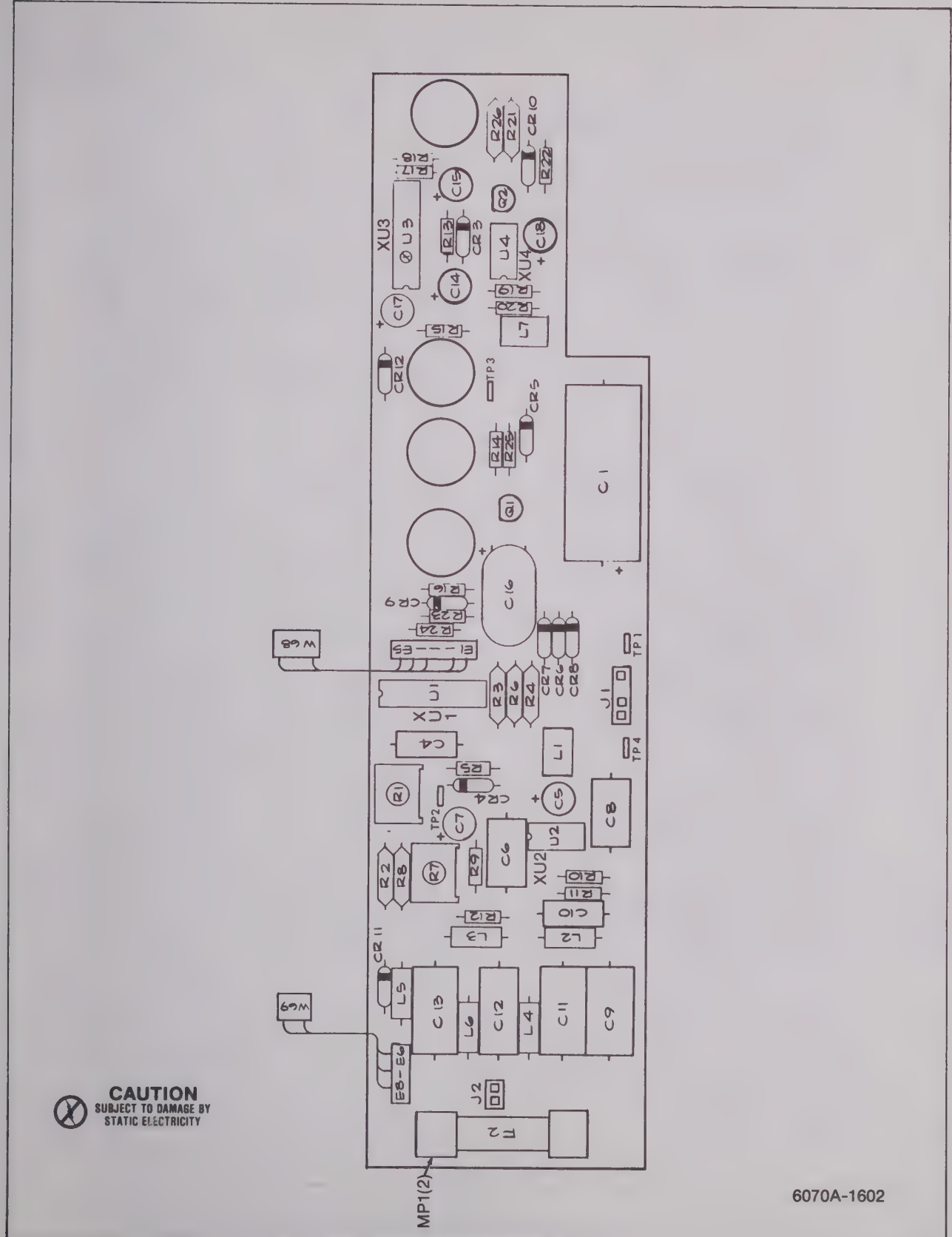
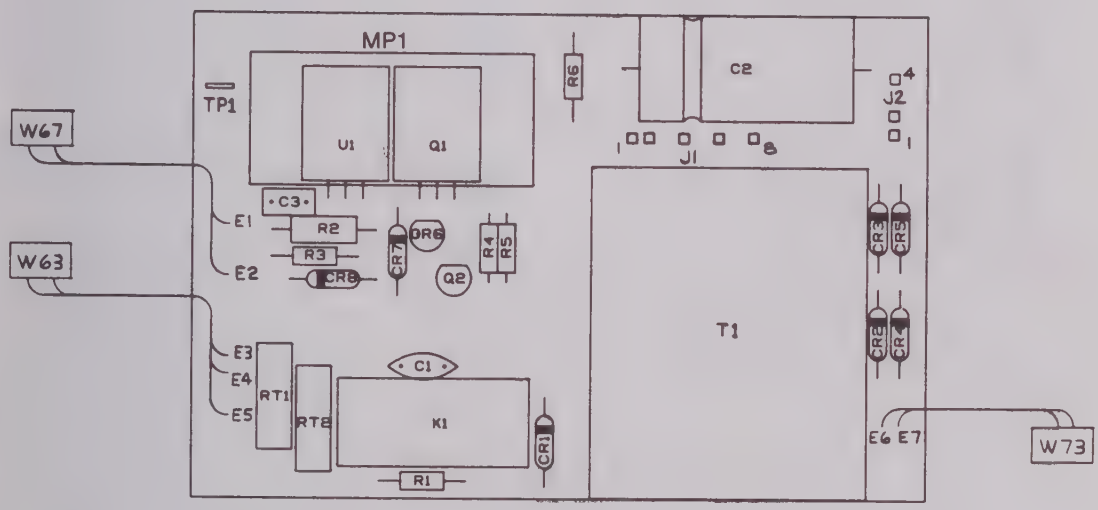


Figure 6-29. A5A2 P/S Regulator PCB Assembly

Table 6-30. A5A3 Auxiliary Transformer PCB Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
A5A3	AUXILIARY TRANSFORMER PCB ASSEMBLY FIGURE 6-30 (6070A-4028T)	489005	89536	489005	REF		
C1	CAP, CER, 1000 PF +/-10%, 1000V	368621	89536	368621	1		
C2	CAP, ELECT, 220 UF +50/-10%, 63V	185850	80031	ET221X063A02	1		
C3	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	1		
CR1	DIODE, RECTIFIER, 1 AMP	368738	04713	1N4004	6	2	
CR2	DIODE, RECTIFIER, 1 AMP	368738	04713	1N4004	REF		
CR3	DIODE, RECTIFIER, 1 AMP	368738	04713	1N4004	REF		
CR4	DIODE, RECTIFIER, 1 AMP	368738	04713	1N4004	REF		
CR5	DIODE, RECTIFIER, 1 AMP	368738	04713	1N4004	REF		
CR6	DIODE, FIELD EFFECT	348482	89536	348482	1	1	
CR7	DIODE, ZENER	267807	04713	1N9708	1	1	
CR8	DIODE, RECTIFIER, 1 AMP	368738	04713	1N4004	REF		
H1	SCREW, PHP, 4-40 X 5/16 (W/U1, Q1)	335141	89536	335141	2		
H2	WASHER, LOCK, #4 (W/U1, Q1)	110395	89536	110395	2		
H3	WASHER, SHOULDER, #4 (NOT SHOWN)	485417	89536	485417	2		
H4	P-NUT, 4-40 (W/U1, Q1)	380196	89536	380196	2		
J1	CONNECTOR, POST	267500	00779	86144-2	8		
J2	CONNECTOR, POST	267500	00779	86144-2	REF		
K1	RELAY, MIN PC, 6VDC	485649	28478	20693-82	1	1	
MP1	HEAT SINK	510651	89536	510651	1		
MP2	INSULATOR, MICA (W/U1, Q1)	412809	89536	412809	2		
Q1	TRANSISTOR, SI, NPN	386128	01295	T1P120	1	1	
Q2	TRANSISTOR, SI, NPN, SM SIGNAL	330803	04713	MPS6560	1	1	
R1	RES, DEP. CAR, 470 +/-5%, 1/4W	343434	80031	CR251-4-5P471E			
R2	RES, COMP, 560 +/-10%, 1/2W	108316	01121	EB5611	1		
R3	RES, DEP. CAR, 56 +/-5%, 1/4W	342618	80031	CR251-4-5P56E	1		
R4	RES, DEP. CAR, 1.6 +/-5%, 1/4W	442038	80031	CR251-4-5P1R6	2		
R5	RES, DEP. CAR, 1.6 +/-5%, 1/4W	442038	80031	CR251-4-5P1R6	REF		
R6	RES, COMP, 27K +/-5%, 1/4W	148148	01121	CB2735	1		
RT1	THERMISTOR, NEGATIVE TC	500371	50157	3D5120	2		
RT2	THERMISTOR, NEGATIVE TC	500371	50157	3D5120	REF		
T1	TRANSFORMER, AUXILIARY POWER	492363	89536	492363	1		
TP1	TEST POINT	512889	00779	62395-1	1		
U1	IC, VOLTAGE REGULATOR	413195	04713	MC7812TP	1	1	
W63	CABLE, 2 CONDUCTOR, SHIELDED	544999	89536	544999	1		
W67	CABLE, 2 CONDUCTOR	514810	89536	514810	1		
W73	CABLE, 2 CONDUCTOR	582908	89536	582908	1		



6070A-1628

Figure 6-30. A5A3 Auxiliary Transformer PCB Assembly

Table 6-31. A5A4 Input Rectifier PCB Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
A5A4	INPUT RECTIFIER PCB ASSEMBLY FIGURE 6-31 (6070A-4029T)	489013	89536	489013	REF		
C1	CAP, CER, 0.0033 UF +/-GMV, 600V	106674	56289	C023B102F332M	2		
C2	CAP, CER, 0.0033 UF +/-GMV, 600V	106674	56289	C023B102F332M	REF		
C3	CAP, ELECT, (MATCHED PAIR)	576280	89536	576280	1		
C4	CAP, PAIRED TO C3						
C5	CAP, CER, 0.010 UF -20/+80%, 250VAC	520254	89536	520254	1		
CR1	DIODE, BRIDGE	523753	83003	VH648X	1	1	
CR2	RES, (VARISTOR) RMS VOLT 275	519355	09214	V275LA15AS14K275	1	1	
E101	PROTECTOR, (V) SURGE	500363	25088	B1-A230	1		
J1	CONNECTOR, POST	267500	00779	86144-2	11		
J2	CONNECTOR, POST	267500	00779	86144-2	REF		
J3	CONNECTOR, POST	267500	00779	86144-2	REF		
L1	CHOKE, LINE, 0.018 MH	492090	89536	492090	2		
L2	CHOKE, LINE, 0.018 MH	492090	89536	492090	REF		
MP1	HOLDER, COMPONENT	422865	89536	422865	2		
R1	RES, COMP, 150K +/-10%, 1/2W	108167	01121	EB15415	2		
R2	RES, COMP, 150K +/-10%, 1/2W	108167	01121	EB15415	REF		
R3	RES, DEP. CAR, 120 +/-5%, 1/4W	442293	80031	CR251-4-5P120E	2		
R4	RES, DEP. CAR, 120 +/-5%, 1/4W	442293	80031	CR251-4-5P120E	REF		
R5	RES, DEP. CAR, 82 +/-5%, 1/4W	442277	80031	CR251-4-5P82E	1		
W1	WIRE, TEFLON, #22 BLK	115774	89536	115774	AR		
W66	RECTIFIER CABLE ASSEMBLY	515213	89536	515213	1		

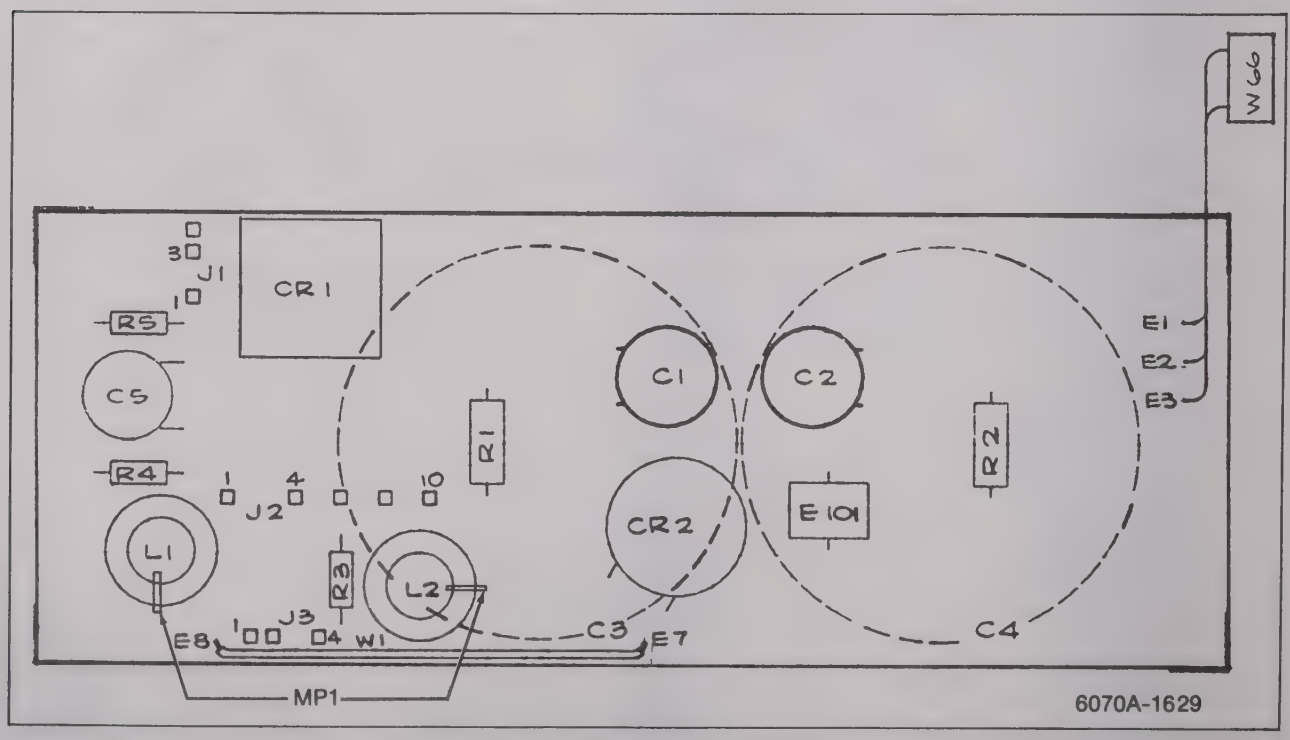


Figure 6-31. A5A4 Input Rectifier PCB Assembly

Table 6-32. A5A5 Switching Transistors Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
A5A5	SWITCHING TRANSISTORS ASSEMBLY FIGURE 6-32 (6070A-4034)	521385	89536	521385	REF		
H1	SCREW, #4-40 X 1/2	256172	89536	256172	4		
H2	WASHER, SPLIT LOCK	147603	89536	147603	4		
H3	WASHER, FIBER	246488	89536	246488	8		
MP1	SOCKET	386144	89536	386144	4		
MP2	INSULATOR, TRANSISTOR	524645	89536	524645	1		
MP3	INSULATOR, TO-3 SHIELD	526566	89536	526566	1		
MP4	INSULATOR, PCB	468843	89536	468843	1		
MP5	PLATE, TRANSISTOR MOUNTING	514430	89536	514430	1		
Q1	TRANSISTOR, SI, NPN	495705	04713	MJ10007	2	1	
Q2	TRANSISTOR, SI, NPN	495705	04713	MJ10007	REF		
W65	CABLE ASSEMBLY	515239	89536	515239	1		

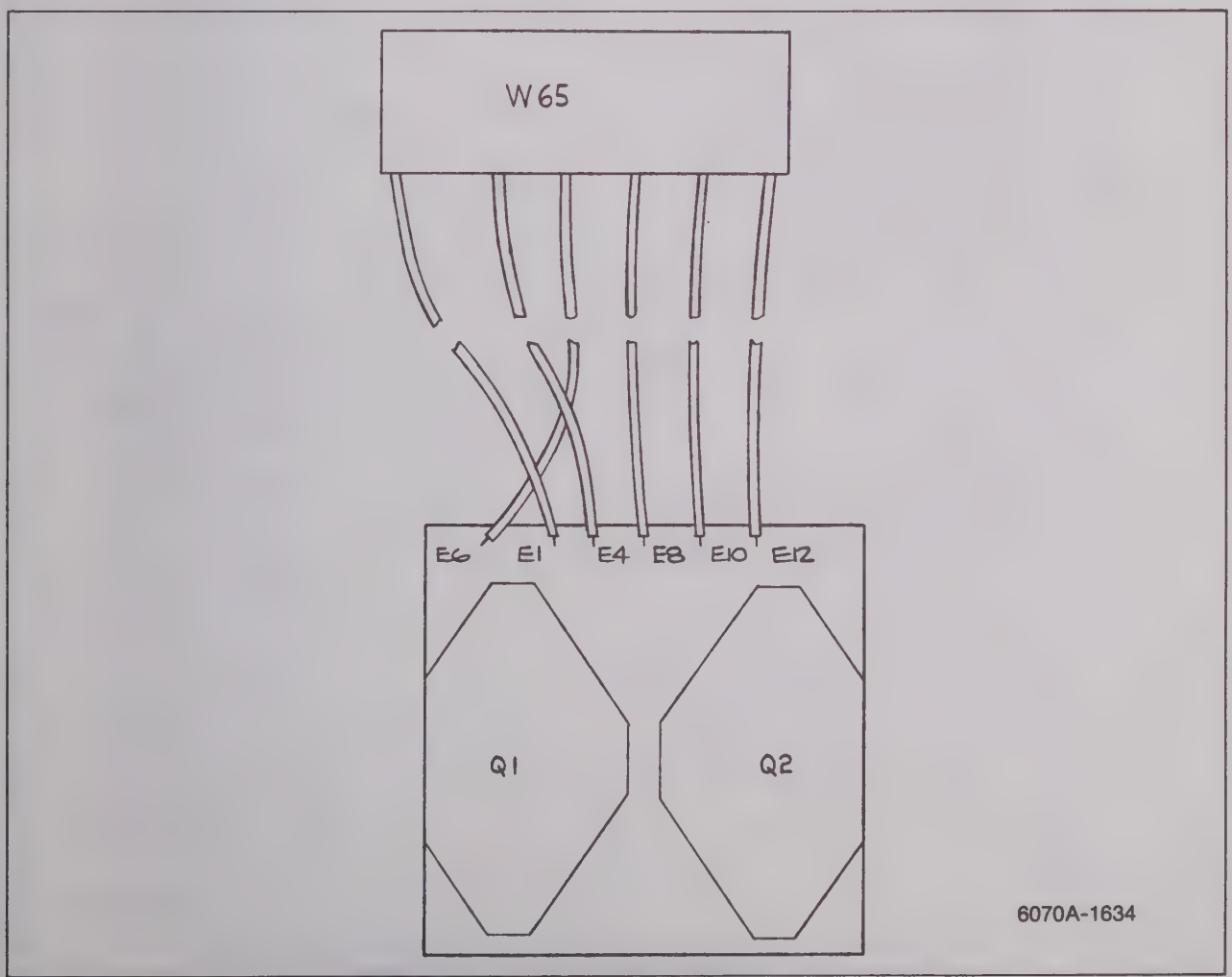


Figure 6-32. A5A5 Switching Transistors Assembly

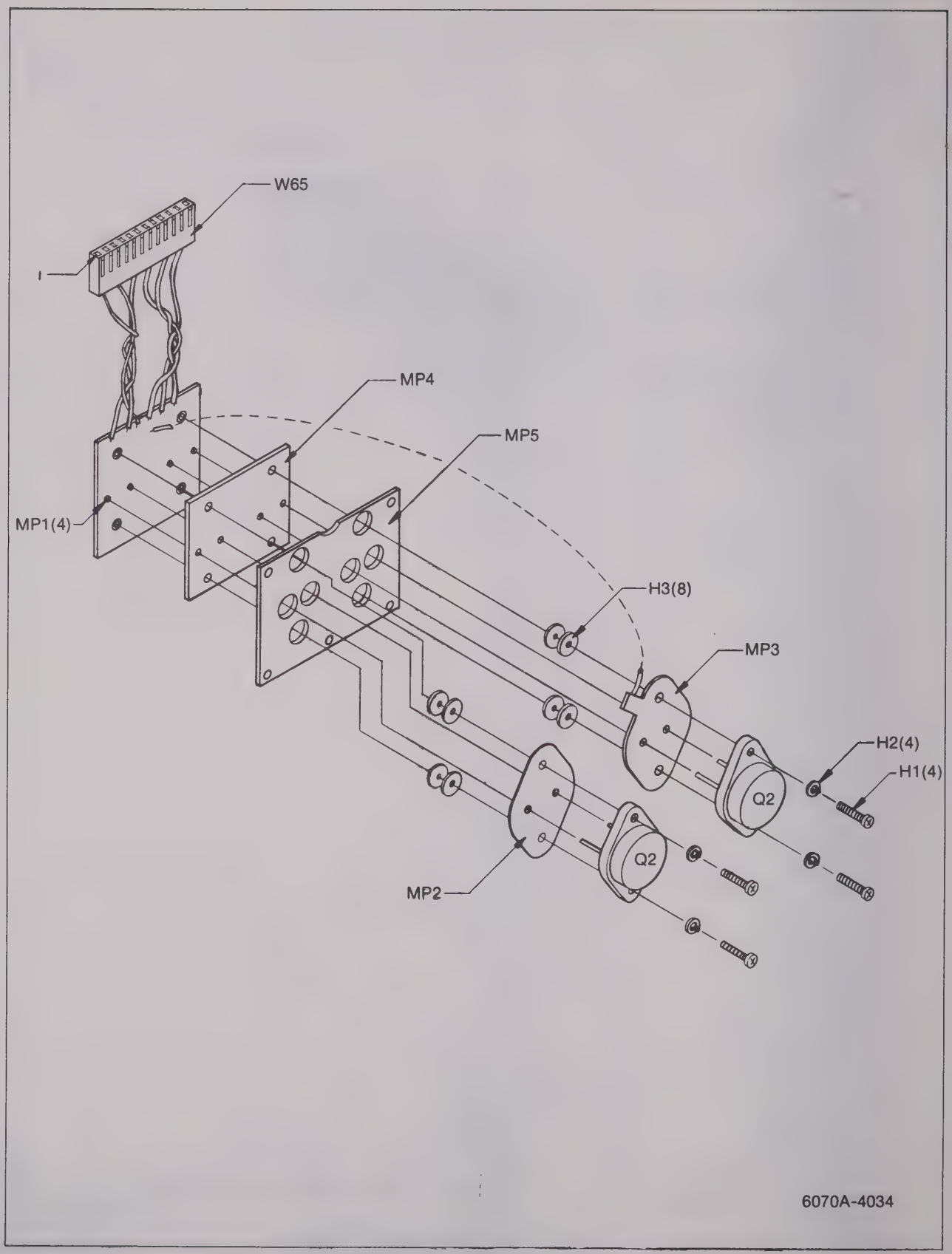


Figure 6-32. A5A5 Switching Transistors Assembly (cont)

Table 6-33. A5A6 Power Supply Capacitor PCB Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
A5A6	POWER SUPPLY CAPACITOR PCB ASSEMBLY FIGURE 6-33 (6070A-4036)	520957	89536	520957	REF		
C1	CAP, ELECT, 47 UF +/-20%, 35V	501262	90201	THF47G35	1		
C2	CAP, ELECT, 150 UF +/-20%, 15V	501270	90201	THF150G15	2		
C3	CAP, ELECT, 150 UF +/-20%, 15V	501270	90201	THF150G15	REF		
C4	CAP, ELECT, 330 UF +/-20%, 6V	501288	90201	THF330G6	2		
C5	CAP, ELECT, 330 UF +/-20%, 6V	501288	90201	THF330G6	REF		
C6	CAP, TA, 22 UF +/-20%, 35V	394775	56289	196D226X0035TE4	1		
C7	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	1		
C8	CAP, TA, 68 UF, 6V/8V	519702	56289	196D686X0008KE4	2		
C9	CAP, TA, 68 UF, 6V/8V	519702	56289	196D686X0008KE4	REF		
L1	INDUCTOR, 33 UH +/-5%, 1030 MA	249086	24759	MR-33	1		
R1	RES, COMP, 100 +/-10%, 1W	109363	01121	GB1011	1		
W7	CABLE ASSEMBLY	515262	89536	515262	1		

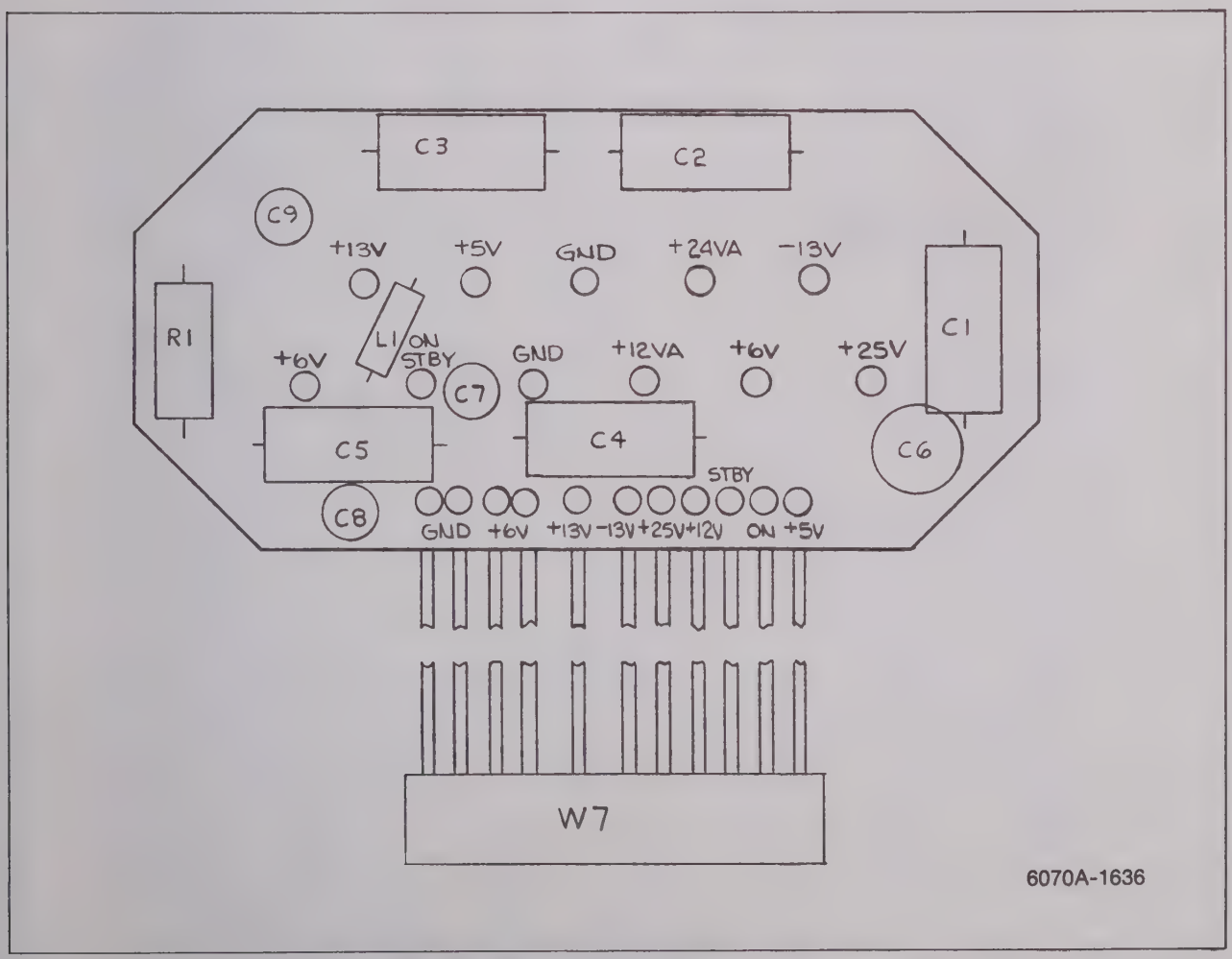


Figure 6-33. A5A6 Power Supply Capacitor PCB Assembly

Table 6-34. A6 Rear Panel Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
A6	POWER SUPPLY ASSEMBLY, REAR PANEL FIGURE 6-34 (6070A-4203T)						1
A6A1	IEEE CONNECTOR PCB ASSEMBLY	463620	89536	463620	1		
A6A2	SERIES PASS MOTHERBOARD PCB ASSEMBLY	489591	89536	489591	1		
A6A3	+5V SERIES PASS PCB ASSEMBLY	489625	89536	489625	1		
A6A4	+12V,-12V, +24V SERIES PASS PCB ASSEMBLY	489658	89536	489658	1		
H1	NUT, SELF LOCKING, 4-40	195255	89536	195255	6		
H2	NUT, 6-32	110569	89536	110569	2		
H4	SCREW, SELF LOCKING, 4-40 X 1/2	353060	89536	353060	2		
H5	SCREW, CAP, 4-40 X 1/2	528307	89536	528307	6		
H6	SCREW, SELF LOCKING, 4-40 X 1/4	185918	89536	185918	7		
H7	SCREW, FHP, 4-40 X 1/4	114884	89536	114884	2		
H8	SCREW, CAP, 4-40 X 1 1/4	528315	89536	528315	4		
H10	SCREW, FHP, 6-32 X 1/4	320093	89536	320093	4		
H11	SCREW, CAP, 6-32 X 1/4	528281	89536	528281	8		
H12	SCREW, SELF LOCKING, 6-32 X 3/8	177022	89536	177022	4		
H13	SCREW, FHP, 6-32 X 3/4	114504	89536	114504	2		
H14	SCREW, CAP, 8-32 X 3/8	295105	89536	295105	4		
H15	SCREW, FHP, 8-32 X 3/8	114116	89536	114116	10		
H16	WASHER, FLAT	176743	89536	176743	2		
H17	WASHER, LOCK, #6	110338	89536	110338	2		
MP1	BRACKET, REAR CORNER ASSEMBLY	540690	89536	540690	2		
MP2	BRACKET, A6A2 SUPPORT	468835	89536	468835	1		
MP3	CONNECTOR HOUSING, 4-PIN	461210	89536	461210	1		
MP4	CONTACT, CRIMP	461236	89536	461236	2		
MP5	COVER, RF OUT	538256	89536	538256	1		
MP8	FAN & REGULATOR	501312	89536	501312	1		
MP9	HANDLE, BLACK PLASTIC	394312	89536	394312	2		
MP10	POLARIZING KEY	461228	89536	461228	1		
MP11	REAR PANEL	462366	89536	462366	1		
MP12	SHIELD, MAGNETIC	616946	89536	616946	1		

1 PART OF THE A5 SECTION

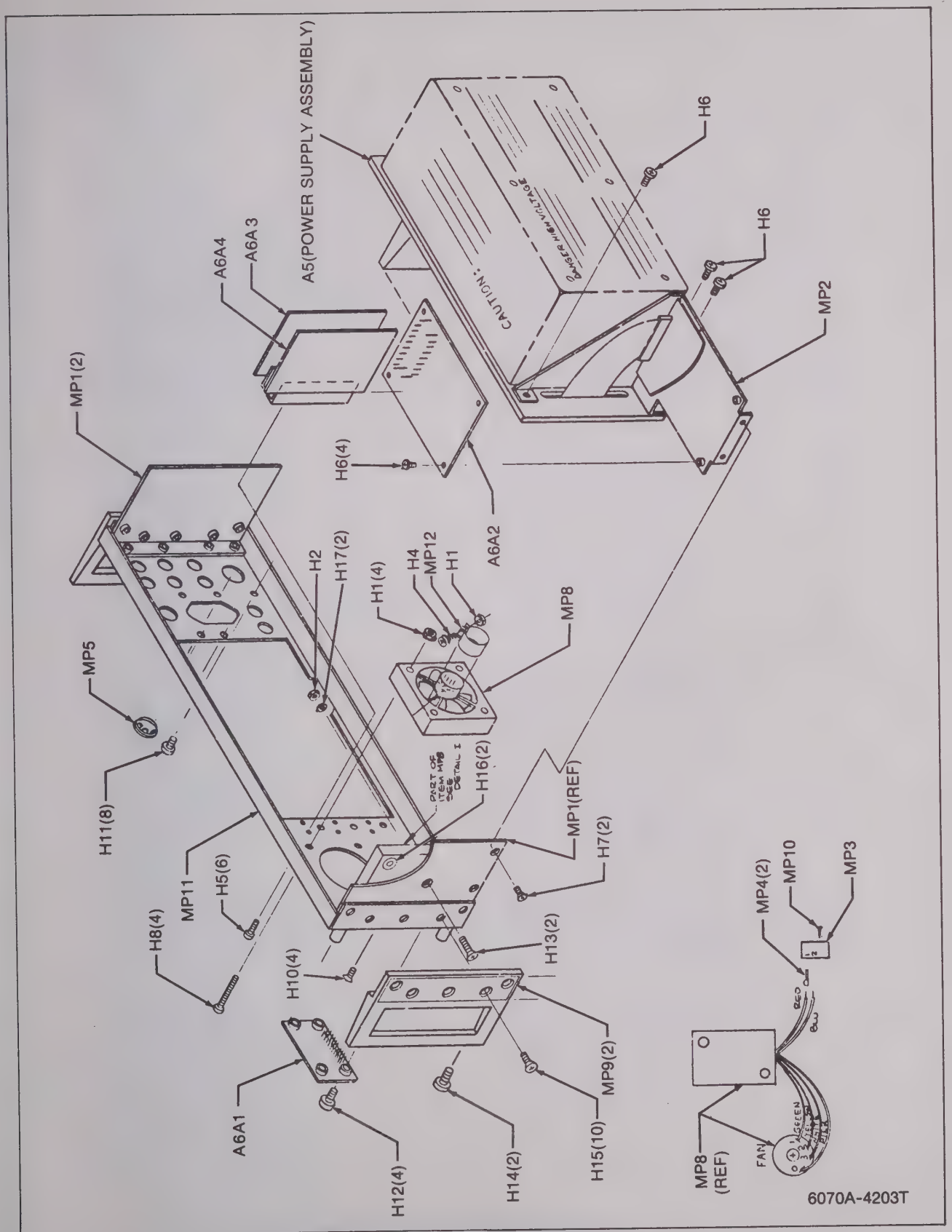


Figure 6-34. A6 Rear Panel Assembly

Table 6-35. A6A1 IEEE Connector PCB Panel Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG. PART NO.	TOT QTY	REC QTY	NOTE
A6A1	IEEE CONNECTOR PCB ASSEMBLY FIGURE 6-35 (6070A-4019T)	457903	89536	457903	REF		
H1	SCREW, CONNECTOR MOUNTING	429472	89536	429472	2		
H2	LOCKWASHER, #8	111070	89536	111070	2		
J1	CONNECTOR, POST	267500	00779	87022-1	33		
J2	CONNECTOR, FEMALE, 24-PIN	441337	02660	57-20240-8	1		
S1	SWITCH, SPST, 8-POS	414490	00779	435166-5	1	1	
XS1	SOCKET, 16-PIN	572347	00779	640358-1	1		

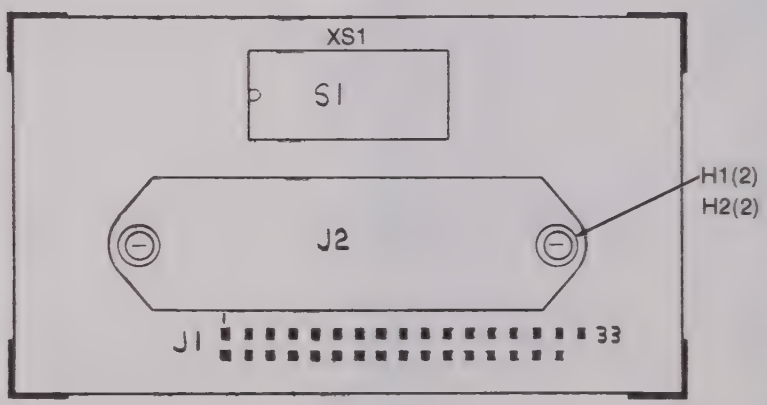
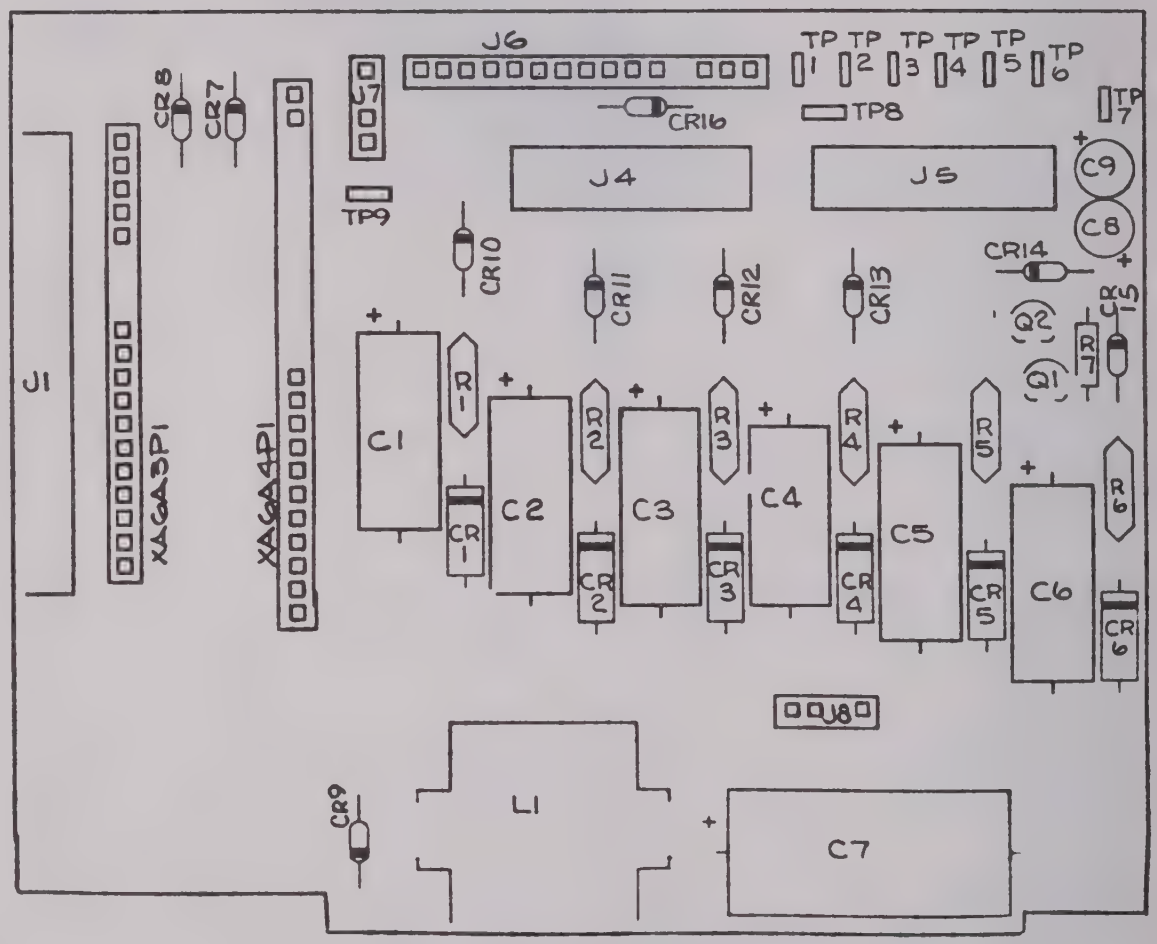


Figure 6-35. A6A1 IEEE Connector PCB Panel Assembly

Table 6-36. A6A2 Series Pass Mother Board PCB Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG. PART NO.	TOT QTY	REC QTY	NOTE
A6A2	SERIES PASS MOTHER BOARD PCB ASSEMBLY FIGURE 6-36 (6070A-4030T)	489591	89536	489591	REF		
C1	CAP, ELECT, 330 UF +/-20%, 6V	501288	90201	THF330G6	3		
C2	CAP, ELECT, 330 UF +/-20%, 6V	501288	90201	THF330G6	REF		
C3	CAP, ELECT, 330 UF +/-20%, 6V	501288	90201	THF330G6	REF		
C4	CAP, ELECT, 150 UF +/-20%, 15V	501270	90201	THF150G15	2		
C5	CAP, ELECT, 150 UF +/-20%, 15V	501270	90201	THF150G15	REF		
C6	CAP, ELECT, 47 UF +/-20%, 35V	501262	90201	THF47G35	1		
C7	CAP, ELECT, 1000 UF -10/+50%, 16V	193896	80031	ET102X016A02	1		
C8	CAP, TA, 68 UF, 6V/8V	519702	56289	196D686X0008KE4	2		
C9	CAP, TA, 68 UF, 6V/8V	519702	56289	196D686X0008KE4	REF		
CR1	DIODE, SI, RECTIFIER	116111	05277	1N4817	6	2	
CR2	DIODE, SI, RECTIFIER	116111	05277	1N4817	REF		
CR3	DIODE, SI, RECTIFIER	116111	05277	1N4817	REF		
CR4	DIODE, SI, RECTIFIER	116111	05277	1N4817	REF		
CR5	DIODE, SI, RECTIFIER	116111	05277	1N4817	REF		
CR6	DIODE, SI, RECTIFIER	116111	05277	1N4817	REF		
CR7	DIODE, SI, RECTIFIER, 1 AMP	368738	04713	1N4004	3	1	
CR8	DIODE, SI, RECTIFIER, 1 AMP	368738	04713	1N4004	REF		
CR9	DIODE, SI, RECTIFIER, 1 AMP	368738	04713	1N4004	REF		
CR10	DIODE, SI, HIGH SPEED SWITCHING	203323	07910	1N4448	7	2	
CR11	DIODE, SI, HIGH SPEED SWITCHING	203323	07910	1N4448	REF		
CR12	DIODE, SI, HIGH SPEED SWITCHING	203323	07910	1N4448	REF		
CR13	DIODE, SI, HIGH SPEED SWITCHING	203323	07910	1N4448	REF		
CR14	DIODE, SI, HIGH SPEED SWITCHING	203323	07910	1N4448	REF		
CR15	DIODE, SI, HIGH SPEED SWITCHING	203323	07910	1N4448	REF		
CR16	DIODE, SI, HIGH SPEED SWITCHING	203323	07910	1N4448	REF		
J1	CONNECTOR, 12-PIN	512160	27264	09-80-1123	1		
J4	CONNECTOR, 6-PIN	512178	27264	09-80-1063	2		
J5	CONNECTOR, 6-PIN	512178	27264	09-80-1063	REF		
J6	CONNECTOR, POST	267500	00779	87022-1	REF		
J7	CONNECTOR, POST	267500	00779	87022-1	REF		
J8	CONNECTOR, POST	267500	00779	87022-1	REF		
L1	INDUCTOR	497297	89536	497297	1		
Q1	TRANSISTOR, SI, NPN	453431	89536	453431	2	1	
Q2	TRANSISTOR, SI, NPN	453431	89536	453431	REF		
R1	RES, MTL. FILM, 4.42K +/-1%, 1/8W	288514	91637	CMF554421F	3		
R2	RES, MTL. FILM, 4.42K +/-1%, 1/8W	288514	91637	CMF554421F	REF		
R3	RES, MTL. FILM, 4.42K +/-1%, 1/8W	288514	91637	CMF554421F	REF		
R4	RES, MTL. FILM, 11.3K +/-1%, 1/8W	293639	91637	CMF551132	1		
R5	RES, MTL. FILM, 2.26K +/-1%, 1/8W	328294	91637	CMF552261F	1		
R6	RES, MTL. FILM, 23.2K +/-1%, 1/8W	291351	91637	CMF552322F	1		
R7	RES, DEP. CAR, 3K +/-5%, 1/4W	441527	80031	CR251-4-5P3K	1		
TP1-TP9	CONNECTOR, TEST POINT	512889	00779	62395-1	9		
XA6A3P1	CONNECTOR, POST	267500	00779	87022-1	49		
XA6A4P1	CONNECTOR, POST	267500	00779	87022-1	REF		

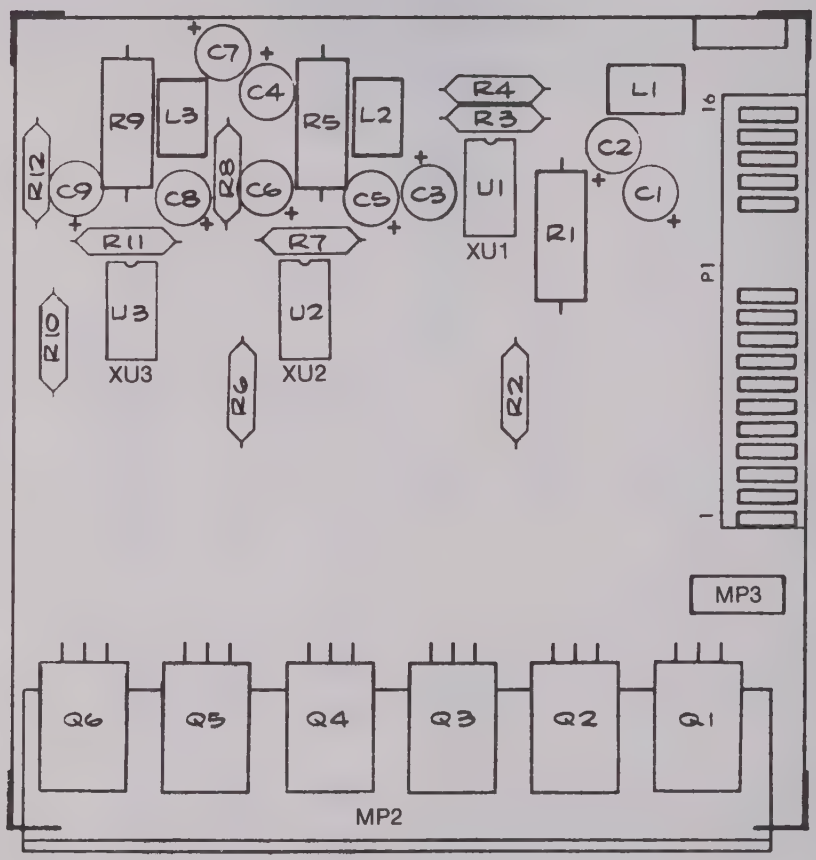


6070A-1630

Figure 6-36. A6A2 Series Pass Mother Board PCB Assembly

Table 6-37. A6A3 +5V Series Pass PCB Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG. PART NO.	TOT QTY	REC QTY	NOTE
A6A3	+5V SERIES PASS PCB ASSEMBLY FIGURE 6-37 (6070A-4031T)	489625	89536	489625	REF		
C1	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	6		
C2	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C3	CAP, TA, 2.2 UF +/-20%, 15V	364216	56289	196D225X0015HA1	2		
C4	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C5	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C6	CAP, TA, 2.2 UF +/-20%, 15V	364216	56289	196D225X0015HA1	REF		
C7	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C8	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C9	CAP, TA, 1 UF +/-20%, 35V	161919	56289	196D105X0035JA1	1		
H1	SCREW, PHP, 4-40 X 5/16 (W/Q1-Q4)	152116	89536	152116	6		
H2	WASHER, #4 (W/Q1-Q4)	110395	89536	110395	6		
H3	WASHER, SHOULDER (W/Q1-Q4)	485417	89536	485417	6		
H4	P-NUT, #4-40 (W/Q1-Q4)	380196	24347	KF2-440	6		
L1	INDUCTOR, COIL, 6-TURN	320911	89536	320911	3		
L2	INDUCTOR, COIL, 6-TURN	320911	89536	320911	REF		
L3	INDUCTOR, COIL, 6-TURN	320911	89536	320911	REF		
MP1	INSULATOR, MICA (W/Q1-Q4)	412809	89536	412809	6		
MP2	HEAT SINK	510529	89536	510529	1		
MP3	CONNECTOR, TEST JACK	149112	74970	105-0753	2		
P1	CONNECTOR, AMP	520593	00779	85863-2	16		
Q1	TRANSISTOR, SI, PNP	504944	04713	2N6107	3	1	
Q2	TRANSISTOR, SELECTED	576306	89536	576306	2	1	
Q3	TRANSISTOR, SI, PNP	504944	04713	2N6107	REF		
Q4	TRANSISTOR, SELECTED	576298	89536	576298	1	1	
Q5	TRANSISTOR, SI, PNP	504944	04713	2N6107	REF		
Q6	TRANSISTOR, SELECTED	576306	89536	576306	REF		
R1	RES, COMP, 33 +/-10%, 1W	109660	01121	GB3301	3		
R2	RES, MTL. FILM, 2.26K +/-1%, 1/8W	328294	91637	CMF552261F	3		
R3	RES, MTL. FILM, 2.21K +/-0.1%, 1/8W	501338	89536	501338	3		
R4	RES, MTL. FILM, 1.65K +/-0.1%, 1/8W	501346	89536	501346	3		
R5	RES, COMP, 33 +/-10%, 1W	109660	01121	GB3301	REF		
R6	RES, MTL. FILM, 2.26K +/-1%, 1/8W	328294	91637	CMF552261F	REF		
R7	RES, MTL. FILM, 2.21K +/-0.1%, 1/8W	501338	89536	501338	REF		
R8	RES, MTL. FILM, 1.65K +/-0.1%, 1/8W	501346	89536	501346	REF		
R9	RES, COMP, 33 +/-10%, 1W	109660	01121	GB3301	REF		
R10	RES, MTL. FILM, 2.26K +/-1%, 1/8W	328294	91637	CMF552261F	REF		
R11	RES, MTL. FILM, 2.21K +/-0.1%, 1/8W	501338	89536	501338	REF		
R12	RES, MTL. FILM, 1.65K +/-0.1%, 1/8W	501346	89536	501346	REF		
U1	IC, LINEAR OP-AMP	413740	12040	LM307N	3	1	
U2	IC, LINEAR OP-AMP	413740	12040	LM307N	REF		
U3	IC, LINEAR OP-AMP	413740	12040	LM307N	REF		
XU1	SOCKET, IC, 8-PIN	478016	91506	30B-AG39D	3		
XU2	SOCKET, IC, 8-PIN	478016	91506	30B-AG39D	REF		
XU3	SOCKET, IC, 8-PIN	478016	91506	30B-AG39D	REF		



6070A-1631

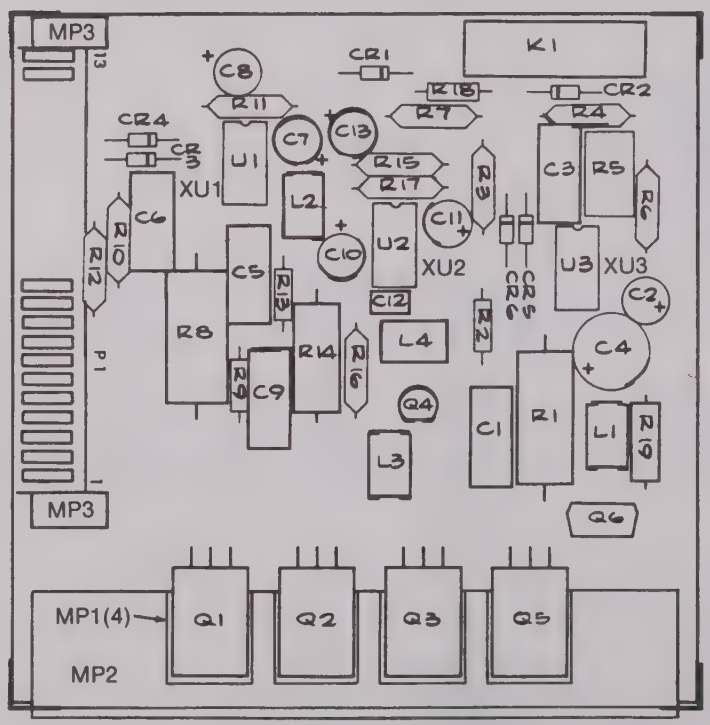
Figure 6-37. A6A3 +5V Series Pass PCB Assembly

Table 6-38. A6A4 +12V, -12V, +24V Series Pass PCB Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG. PART NO.	TOT QTY	REC QTY	NOTE
A6A4	+12V,-12V, +24V SERIES PASS PCB ASSEMBLY FIGURE 6-38 (6070A-4032T)	489658	89536	489658	REF		
C1	CAP, MYLAR, 0.022 UF +/-10%, 250V	234484	73445	C280MAE/A22K	2		
C2	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	2		
C3	CAP, MYLAR, 0.0068 UF +/-10%, 50V	342881	80031	75F1R5A682	1		
C4	CAP, TA, 68 UF +/-20%, 15V	193615	56289	196D686X0015LA3	1		
C5	CAP, MYLAR, 0.22 UF +/-10%, 100V	436113	73445	C280MAH/A220K	1		
C6	CAP, MYLAR, 0.01 UF +/-10%, 50V	309906	80031	75F1R5A100	1		
C7	CAP, TA, 6.8 UF +/-20%, 35V	363713	56289	196D685X0035KA1	REF		
C8	CAP, TA, 2.2 UF +/-20%, 20V	161927	56289	196D225X0020HA1	1		
C9	CAP, MYLAR, 0.022 UF +/-10%, 250V	234484	73445	C280MAE/A22K	REF		
C10	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	3		
C11	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
C12	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	1		
C13	CAP, TA, 10 UF +/-20%, 20V	330662	56289	196D106X0020KA1	REF		
CR1	DIODE, ZENER	357848	04713	SZG2011B	1	1	
CR2	DIODE, SI RECTIFIER	343491	01295	1N4002	1	1	
CR3	DIODE, SI, HIGH SPEED SWITCHING	203323	07910	1N4448	4	1	
CR4	DIODE, SI, HIGH SPEED SWITCHING	203323	07910	1N4448	REF		
CR5	DIODE, SI, HIGH SPEED SWITCHING	203323	07910	1N4448	REF		
CR6	DIODE, SI, HIGH SPEED SWITCHING	203323	07910	1N4448	REF		
H1	SCREW, PHP, 4-40 X 5/16 (W/Q1, 2, 3, 5)	152116	89536	152116	4		
H2	LOCKWASHER, SPLIT, #4 (W/Q1, 2, 3, 5)	110395	89536	110395	4		
H3	P-NUT, #4-40 <W/Q1, 2, 3, 5)	380196	24347	KF2-440	4		
H4	WASHER, SHOULDER (W/Q1, 2, 3, 5)	485417	89536	485417	4		
K1	RELAY, SPST, 3W, 28VDC	461434	15636	R7254-1	1	1	
L1	INDUCTOR, COIL, 6-TURN	320911	89536	320911	4		
L2	INDUCTOR, COIL, 6-TURN	320911	89536	320911	REF		
L3	INDUCTOR, COIL, 6-TURN	320911	89536	320911	REF		
L4	INDUCTOR, COIL, 6-TURN	320911	89536	320911	REF		
MP1	INSULATOR, MICA	412809	89536	412809	4		
MP2	HEAT SINK	510529	89536	510529	1		
MP3	CONNECTOR, PCB MOUNT TEST JACK	149112	74970	105-0753	2		
P1	CONNECTOR	520593	0079	85863-2	13		
Q1	TRANSISTOR, SELECTED	576298	89536	576298	2	1	
Q2	TRANSISTOR, SI, PNP	504944	04713	2N6107	2	1	
Q3	TRANSISTOR, SELECTED	576298	89536	576298	REF		
Q4	TRANSISTOR, SI, PNP	229898	04713	MPS6522	1	1	
Q5	TRANSISTOR, SI, PNP	504944	04713	2N6107	REF		
Q6	TRANSISTOR, SI, NPN, POWER (SELECT)	343970	89536	343970	1	1	
R1	RES, COMP, 300 +/-5%, 2W	603241	01121	HB3015	1		
R2	RES, DEP. CAR, 47 +/-5%, 1/42	441592	80031	CR251-4-5P47E	1		
R3	RES, MTL. FILM, 1K +/-1%, 1/8W	168229	91637	CMF551001F	1		
R4	RES, MTL. FILM, 6.04K +/-0.1%, 1/8W	512301	89536	512301	1		
R5	RES, VAR, 500 +/-10%, 1/2W	291120	89536	291120	1		
R6	RES, MTL. FILM, 2.26K +/-0.1%, 1/8W	501320	89536	501320	1		
R7	RES, MTL. FILM, 8.87K +/-1%, 1/8W	294967	91637	CMF558871F	1		
R8	RES, COMP, 100 +/-10%, 2W	109934	01121	HB1011	1		
R9	RES, DEP. CAR, 15 +/-5%, 1/4W	348755	80031	CR251-4-5P15E	2		

Table 6-38. A6A4 +12V, -12V, +24V Series Pass PCB Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG. PART NO.	TOT QTY	REC QTY	NOTE
R10	RES, MTL. FILM, 20K +/-1%, 1/8W	291872	91637	CMF552002F	2		
R11	RES, MTL. FILM, 20K +/-0.1%, 1/8W	340620	89536	340620	4		
R12	RES, MTL. FILM, 20K +/-0.1%, 1/8W	340620	89536	340620	REF		
R13	RES, DEP. CAR, 15 +/-5%, 1/4W	348755	80031	CR251-4-5P15E	REF		
R14	RES, COMP, 390 +/-10%, 1W	109561	01121	GB3911	1		
R15	RES, MTL. FILM, 20K +/-1%, 1/8W	291872	91637	CMF552002F	REF		
R16	RES, MTL. FILM, 20K +/-0.1%, 1/8W	340620	89536	340620	REF		
R17	RES, MTL. FILM, 20K +/-0.1%, 1/8W	340620	89536	340620	REF		
R18	RES, DEP. CAR, 1.8K +/-5%, 1/8W	441444	80031	CR251-4-5P1K8	1		
R19	RES, COMP, 1.5K +/-5%, 1/2W	266353	01121	EB1525	1		
U1	IC, LINEAR OP-AMP	402750	12040	LM741CN	1	1	
U2	IC, LINEAR OP-AMP	413740	12040	LM307N	2	1	
U3	IC, LINEAR OP-AMP	413740	12040	LM307N	REF		
XU1	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	3		
XU2	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	REF		
XU3	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	REF		



6070A-1632

Figure 6-38. A6A4 +12V, -12V, +24V Series Pass PCB Assembly

Table 6-39. A7 Delay Cable Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
A7	DELAY CABLE ASSEMBLY FIGURE 6-39 (6070A-4205)	527457	89536	527457	REF		1
H1	SCREW, FHP, 6-32 X 1/4	320093	89536	320093	12		
MP1	DELAY CABLE	524116	89536	524116	1		
MP2	DELAY CABLE SUPPORT	496489	89536	496489	1		
MP3	DELAY CABLE SUPPORT COVER	496463	89536	496463	1		

1 USED ON NEXT HIGHER ASSEMBLY, A3

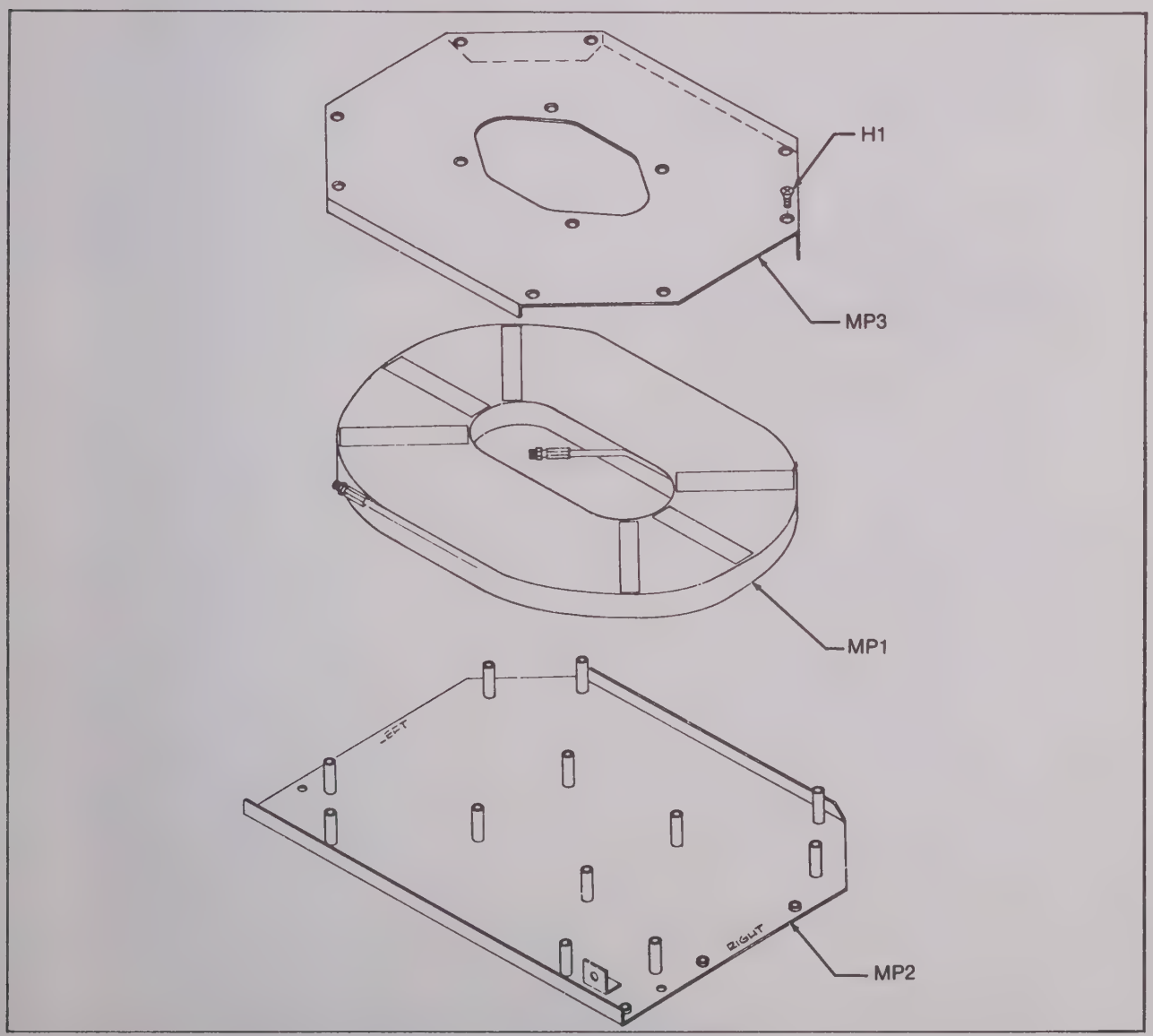


Figure 6-39. A7 Delay Cable Assembly

Section 7
Option Information

7-1. INTRODUCTION

7-2. The information in this section describes service information for the options that can be used with the 6070A and 6071A Synthesized Signal Generators. The options are listed in Table 7-1. Service information for each option is described in an individual subsection. For example, service information for the 607XA-130 Oven Reference is described in subsection 7A and information about option 607XA-570 is located in subsection 7B.

Table 7-1. 6070A/6071A Options

OPTION NO.	NAME	SECTION
607XA-130	Oven Reference	7A
607XA-570	Non-volatile Memory	7B
607XA-830	Rear Panel RF Output	7C
607XA-870	Reverse Power Protection	7D

Section 7A
607XA Oven Reference

7A-1. INTRODUCTION

7A-2. The information in this section describes service information for this option.

7A-3. THEORY OF OPERATION

7A-4. The theory of operation for this option is described in the appropriate place(s) in Section 2 of this manual to provide an integrated view of how this option works with the rest of the instrument.

7A-5. ACCESS PROCEDURES

7A-6. Introduction

7A-7. The 607XA-130 Oven Reference Option Assembly is attached to the right rear corner bracket adjacent to the power supply. The access procedure allows access to the Oven Reference Option Assembly.

7A-8. Disassembly Procedure

7A-9. Complete the following procedure to gain access to the 607XA-130 Oven Reference Option Assembly.

1. Set the front panel POWER control to STBY. Set the rear panel MAIN POWER to OFF. Remove line power from the instrument.

2. Remove the top and bottom covers to gain access to the interior of the instrument.

3. Disconnect cable W8 from Series-Pass Motherboard J7.

4. Disconnect the 10 MHz out cable (W19) from J1 on the Oven ReferenceOption.

5. Disconnect the ON/OFF cable (W18) from J2 on the Oven Reference Option.

6. Remove the four screws that secure the Oven Reference Option to the bracket and lift the assembly out of the instrument.

7A-10. Assembly Procedure

7A-11. Complete the following steps to assemble the instrument:

1. Make sure that the front panel POWER control is in the STBY position, that the rear panel MAIN switch is in the OFF position, and that the instrument is disconnected from line power.

2. Insert the 607XA-130 Oven Reference Option into the instrument between the power supply and the right rear bracket.

3. Align the oven option mounting holes with the bracket screw holes and secure the Oven Reference Option to the bracket with the four screws removed during disassembly.

4. Connect cable W19 to Oven Reference Option J1 and connect cable W18 to Oven Reference Option J2.

5. Connect cable W8 to Series-Pass Motherboard J7.

6. Install the top and bottom covers of the instrument.

7A-12. TROUBLESHOOTING

7A-12. The troubleshooting procedures in Section 4 of this manual should allow fault isolation in this option.

7A-13. NON-ROUTINE ADJUSTMENTS

7A-14. There are no non-routine adjustments for this option.

Section 7B
607XA-570 Non-volatile Memory

7B-1. INTRODUCTION
7B-2. The information in this section describes service information for this option.

7B-3. THEORY OF OPERATION
7B-4. The theory of operation for this option is described in the appropriate place(s) in Section 2 of this manual to provide an integrated view of how this option works with the rest of the instrument.

7B-5. ACCESS PROCEDURES
7B-6. Introduction
7B-7. The 607XA-570 Nonvolatile Memory Printed Circuit (A2A2 PCB) is located in the Controller Assembly (Figure 3-9). The access procedure allows access to the printed circuit board. Figure 3-9 and 3-16 illustrate the disassembly and assembly procedures.

7B-8. Disassembly Procedure
7B-9. Complete the following procedure to gain access to the A2A2 Nonvolatile Memory PCB.

1. Complete the disassembly portion of the Front Panel/Controller Assembly Access Procedure. (Refer to this titled paragraph in Section 3.)

2. Remove the eight screws (four from each side) that secure the Controller Assembly to the Front Panel Assembly (Figure 3-9).

3. Disconnect the cables from J3 and J4 on the Controller Assembly.

4. Remove the RF OUTPUT connector from the Controller Assembly chassis.

5. Remove the six screws from the shield and lift the shield away from Controller Assembly Chassis

6. Remove the five screws that secure the A2A2 Nonvolatile Memory PCB to the chassis and remove the PCB.

7B-10. Assembly Procedure
7B-11. Complete the following Procedure to assemble the instrument.

1. Install the Nonvolatile Memory PCB in the Controller Assembly and secure it using the five screws that were removed in the disassembly procedure (Figure 3-16).

2. Install the shield and secure it using the six screws removed during disassembly.

3. Install the RF OUTPUT connector to the Controller Assembly chassis and secure it using the two screws removed during disassembly.

4. Connect cables to J3 and J4 then assemble Controller Assembly to the Front Panel Assembly.

5. Secure the units using the eight screws removed during disassembly (Figure 3-9).

7B-12. TROUBLESHOOTING
7B-13. The troubleshooting procedures in Section 4 of this manual should allow fault isolation in this option.

7B-14. NON-ROUTINE ADJUSTMENTS
7B-15. There are no non-routine adjustments for this option.

7B-16. LIST OF REPLACEABLE PARTS
7B-17. Table 7B-1 lists all replaceable parts for this option. Figure 7B-1 shows the location of each component.

7B-18. SCHEMATIC DIAGRAMS

7B-19. The schamatic diagram for this option is located in the 6070A/6071A Scematic Manual.

Table 7B-1. Non-Volatile Memory Option Assembly

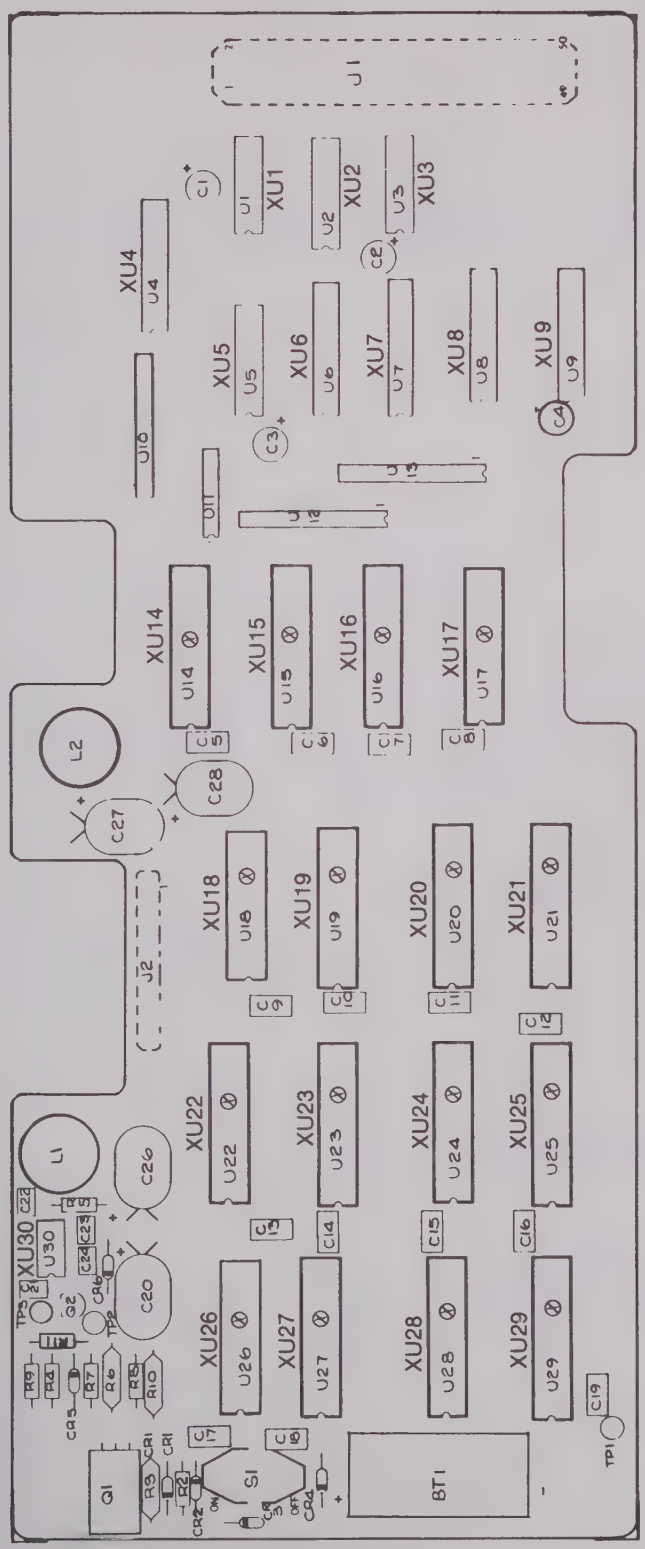
REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
	Ø NON-VOLATILE MEMORY OPTION ASSEMBLY FIGURE 7B (6070A-4027T)	ORDER	BY	OPTION 607XA-570			
BT1	BATTERY, PRIMARY, 2.9V LITHIUM	519249	90303	LO-37-305154	1	1	
C1	CAP, TA, 5.6 UF +/-20%, 25V	368969	56289	196D565X0025KA1	4		
C2	CAP, TA, 5.6 UF +/-20%, 25V	368969	56289	196D565X0025KA1	REF		
C3	CAP, TA, 5.6 UF +/-20%, 25V	368969	56289	196D565X0025KA1	REF		
C4	CAP, TA, 5.6 UF +/-20%, 25V	368969	56289	196D565X0025KA1	REF		
C5	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	15		
C6	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C7	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C8	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C9	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C10	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C11	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C12	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C13	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C14	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C15	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C16	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C17	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C18	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C19	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		
C20	CAP, TA, 150 UF +/-20%, 20V	422576	56289	196D157X0020TA1	2		
C21	CAP, CER, 100 PF +/-2%, 100V	512848	89536	512848	4		
C22	CAP, CER, 100 PF +/-2%, 100V	512848	89536	512848	REF		
C23	CAP, CER, 100 PF +/-2%, 100V	512848	89536	512848	REF		
C24	CAP, CER, 100 PF +/-2%, 100V	512848	89536	512848	REF		
C26	CAP, TA, 150 UF +/-20%, 20V	422576	56289	196D157X0020TA1	REF		
C27	CAP, TA, 22 UF +/-20%, 10V	474288	56289	195D223X0010TE4	2		
C28	CAP, TA, 22 UF +/-20%, 10V	474288	56289	195D223X0010TE4	REF		
CR1	DIODE, SI, CONTROLLER FWD VOL	234468	07910	TD9039	4	1	
CR2	DIODE, SI, CONTROLLER FWD VOL	234468	07910	TD9039	REF		
CR3	DIODE, ZENER, 4.3V +/-5%	180455	04713	1N749A	1		
CR4	DIODE, SI, CONTROLLER FWD VOL	234468	07910	TD9039	REF		
CR5	DIODE, SI, CONTROLLER FWD VOL	234468	07910	TD9039	REF		
CR6	DIODE, ZENER, 3.9V +/-10%	113316	04713	1N748	1	1	
J1	CONNECTOR, 50 PIN	519538	00779	86418-8	1		
J2	CONNECTOR, 12 PIN	530261	00779	87334-4	1		
L1	INDUCTOR, 50 MH	540823	89536	540823	2		
L2	INDUCTOR, 50 MH	540823	89536	540823	REF		
MP1	COMPONENT TIE DOWN (NOT SHOWN)	422857	89536	422857	1		
MP2	SPACER, PCB STANDOFF (NOT SHOWN)	520205	89536	520205	5		
Q1	TRANSISTOR, SI, NPN, POWER (SELECT)	343970	89536	343970	1	1	
Q2	TRANSISTOR, SI, NPN	218081	04713	MPS6520	1	1	

Table 7B-1. Non-Volatile Memory Option Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
R2	RES, DEP. CAR, 3.9K +/-5%, 1/4W	342600	80031	CR251-4-5P3K9	1		
R3	RES, MTL. FILM, 1K +/-1%, 1/8W	168229	91637	CMF551001F	1		
R4	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	5		
R5	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R6	RES, MTL. FILM, 10 +/-1%, 1/8W	268789	91637	CMF550100F	2		
R7	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R8	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R9	RES, DEP. CAR, 68 +/-5%, 1/4W	414532	80031	CR251-4-5P68E	1		
R10	RES, MTL. FILM, 10 +/-1%, 1/8W	268789	91637	CMF550100F	REF		
R11	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
S1	SWITCH, SLIDE, SPDT	386813	89536	386813	1	1	
TP1	CONNECTOR, TEST POINT	512889	00779	62395-1	3		
TP2	CONNECTOR, TEST POINT	512889	00779	62395-1	REF		
TP3	CONNECTOR, TEST POINT	512889	00779	62395-1	REF		
U1	IC, TTL, POS NAND GATES AND INVERTERS	394205	01295	SN74LS03N	1	1	
U2	IC, TTL, LO-PWR, 3-8 LINE DECODER	407585	01295	SN74LS138N	2	1	
U3	IC, TTL, HEX INVERTER	393058	01295	SN74LS04N	1	1	
U4	IC, LO-PWR, SCHOTTKY TRI-ST OCTAL BFR.	429902	12040	DMB1LS95N	5	1	
U5	IC, TTL, LO-PWR, 3-8 LINE DECODER	407585	01295	SN74LS138N	REF		
U6	IC, LO-PWR, SCHOTTKY TRI-ST OCTAL BFR.	429902	12040	DMB1LS95N	REF		
U7	IC, LO-PWR, SCHOTTKY TRI-ST OCTAL BFR.	429902	12040	DMB1LS95N	REF		
U8	IC, LO-PWR, SCHOTTKY TRI-ST OCTAL BFR.	429902	12040	DMB1LS95N	REF		
U9	IC, LO-PWR, SCHOTTKY TRI-ST OCTAL BFR.	429902	12040	DMB1LS95N	REF		
U10	RESISTOR NETWORK	461038	89536	461038	3		
U11	RESISTOR NETWORK	412726	89536	412726	1		
U12	RESISTOR NETWORK	461038	89536	461038	REF		
U13	RESISTOR NETWORK	461038	89536	461038	REF		
U14Ø	IC, C-MOS, 1024 BIT STATIC RAM	429860	34649	P5101L	16	4	
U15Ø	IC, C-MOS, 1024 BIT STATIC RAM	429860	34649	P5101L	REF		
U16Ø	IC, C-MOS, 1024 BIT STATIC RAM	429860	34649	P5101L	REF		
U17Ø	IC, C-MOS, 1024 BIT STATIC RAM	429860	34649	P5101L	REF		
U18Ø	IC, C-MOS, 1024 BIT STATIC RAM	429860	34649	P5101L	REF		
U19Ø	IC, C-MOS, 1024 BIT STATIC RAM	429860	34649	P5101L	REF		
U20Ø	IC, C-MOS, 1024 BIT STATIC RAM	429860	34649	P5101L	REF		
U21Ø	IC, C-MOS, 1024 BIT STATIC RAM	429860	34649	P5101L	REF		
U22Ø	IC, C-MOS, 1024 BIT STATIC RAM	429860	34649	P5101L	REF		
U23Ø	IC, C-MOS, 1024 BIT STATIC RAM	429860	34649	P5101L	REF		
U24Ø	IC, C-MOS, 1024 BIT STATIC RAM	429860	34649	P5101L	REF		
U25Ø	IC, C-MOS, 1024 BIT STATIC RAM	429860	34649	P5101L	REF		
U26Ø	IC, C-MOS, 1024 BIT STATIC RAM	429860	34649	P5101L	REF		
U27Ø	IC, C-MOS, 1024 BIT STATIC RAM	429860	34649	P5101L	REF		
U28Ø	IC, C-MOS, 1024 BIT STATIC RAM	429860	34649	P5101L	REF		
U29Ø	IC, C-MOS, 1024 BIT STATIC RAM	429860	34649	P5101L	REF		
U30	IC, LINEAR, OP-AMP	418566	12040	LM358N	1	1	
XU1	SOCKET, IC, 14-PIN	370304	12040	MM74C906M	2		
XU2	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	2		
XU3	SOCKET, IC, 14-PIN	370304	12040	MM74C906M	REF		
XU4	SOCKET, IC, 20-PIN	454421	01295	C932002	5		
XU5	SOCKET, IC, 16-PIN	370312	91506	316-AG39D	REF		
XU6	SOCKET, IC, 20-PIN	454421	01295	C932002	REF		

Table 7B-1. Non-Volatile Memory Option Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
XU7	SOCKET, IC, 20-PIN	454421	01295	C932002	REF		
XU8	SOCKET, IC, 20-PIN	454421	01295	C932002	REF		
XU9	SOCKET, IC, 20-PIN	454421	01295	C932002	REF		
XU14	SOCKET, IC, 22 PIN	453126	91506	322-AG39D	16		
XU15	SOCKET, IC, 22 PIN	453126	91506	322-AG39D	REF		
XU16	SOCKET, IC, 22 PIN	453126	91506	322-AG39D	REF		
XU17	SOCKET, IC, 22 PIN	453126	91506	322-AG39D	REF		
XU18	SOCKET, IC, 22 PIN	453126	91506	322-AG39D	REF		
XU19	SOCKET, IC, 22 PIN	453126	91506	322-AG39D	REF		
XU20	SOCKET, IC, 22 PIN	453126	91506	322-AG39D	REF		
XU21	SOCKET, IC, 22 PIN	453126	91506	322-AG39D	REF		
XU22	SOCKET, IC, 22 PIN	453126	91506	322-AG39D	REF		
XU23	SOCKET, IC, 22 PIN	453126	91506	322-AG39D	REF		
XU24	SOCKET, IC, 22 PIN	453126	91506	322-AG39D	REF		
XU25	SOCKET, IC, 22 PIN	453126	91506	322-AG39D	REF		
XU26	SOCKET, IC, 22 PIN	453126	91506	322-AG39D	REF		
XU27	SOCKET, IC, 22 PIN	453126	91506	322-AG39D	REF		
XU28	SOCKET, IC, 22 PIN	453126	91506	322-AG39D	REF		
XU29	SOCKET, IC, 22 PIN	453126	91506	322-AG39D	REF		
XU30	SOCKET, IC, 8-PIN	478016	91506	308-AG39D	1		



CAUTION
SUBJECT TO DAMAGE BY STATIC ELECTRICITY

6070A-1627

Figure 7B-1. Non-Volatile Memory Option Assembly

Section 7C
607XA-830 Rear Panel RF Output Option

7C-1. INTRODUCTION

7C-2. The information in this section describes service information for this option.

7C-3. THEORY OF OPERATION

7C-4. The theory of operation for this option is described in the appropriate place(s) in Section 2 of this manual to provide an integrated view of how this option works with the rest of the instrument.

7C-5. ACCESS PROCEDURES

7C-6. Introduction

7C-7. The 607XA-830 Rear Panel RF Output Option consists of a type N connector and cable W51 connected to the output module. This option provides RF output at the rear panel instead of the front panel.

7C-8. Disassembly Procedure

7C-9. Complete the following procedure to gain access to the Type N connector.

1. Set the front panel POWER control to STBY. Set the rear panel MAIN POWER to OFF. Remove line power from the instrument.

2. Remove bottom cover to gain access to the interior of the instrument.

3. Disconnect the cable from the rear RF OUT connector.

4. Remove the Hex nut from the type N connector and remove the connector from the instrument.

7C-10. Assembly Procedure

7C-11. Complete the following procedure to assemble the instrument.

1. Insert the type N connector in the rear panel and secure it with the Hex nut.

2. Connect cable W51 to the type N connector.

3. Replace bottom cover.

7C-12. TROUBLESHOOTING

7C-13. This option requires no troubleshooting procedure.

7C-14. NON-ROUTINE ADJUSTMENTS

7C-15. There are no non-routine adjustments for this option.

Section -7D
607XA-870 Reverse Power Protection

7D-1. INTRODUCTION
7D-2. The information in this section describes service information for this option.

7D-3. THEORY OF OPERATION
7D-4. The theory of operation for this option is described in the appropriate place(s) in Section 2 of this manual to provide an integrated view of how this option works with the rest of the instrument.

7D-5. ACCESS PROCEDURES
7D-6. Introduction
7D-7. The 607XA-870 Reverse Power Protection Option consists ofthe A4A5 Printed Circuit Board located in the top of the Output Module (Figure 3-4). This procedure allows access to the printed circuit board for maintenance procedures. After the cover has been removed, the cover screws must be torqued back in place to insure specific RF integrity. Section 3 Figures 3-4, 3-8, 3-9, and 3-13 illustrate the following disassembly and assembly procedures.

CAUTION

To prevent damage to the coaxial cables and connectors, observe the following cautions when connecting the cables and connectors.

1. Do not bend the cables.

2. Do not place excessive strain between the cables and connectors.

3. Start SMA connectors carefully, keep the connector straight with respect to the jack.

7D-8. Disassembly Procedure
7D-9. Complete the following procedure to gain access to the A4A5 Reverse Power Protect printed circuit board.

1. Set the front panel POWER control to STBY. Set the rear panel MAIN POWER control to OFF. Remove line power from the instrument.

2. Remove the bottom cover from the instrument.

3. Complete the following steps to swing out the Output Module:

   a. Refer to Figure 3-8 and disconnect J1, J4, J5, J13, and J14.

   b. Remove the four screws and washers (H1 and H2) and the two screws (H3) shown in Figure 3-9.

   c. Lift the Output Module until J10, J11, and J12 can be reached. Disconnect J10, J11, and J12.

   d. Swing the module out 90 degrees and lock it in this position by installing the two screws (H3) in position B (Figure 3-9). Remove the A4A5 cover screws (Figure 3-13).

4. Carefully lift the cover off; do not disturb the RF gasket under the cover.

7D-10. Assembly Procedure
7D-11. Complete the following procedure to assemble the instrument:

1. Remove the jumper cables that have been installed.

2. Make sure the RF gasket is in place (Figure 3-4) and inspect the RF gasket for damage (areas that are folded over, worn, or pinched).

3. If required, use the following steps to properly install the RF gasket.

a. Start the gasket at the START GASKET point (Figure 3-4).

b. Traveling in the direction indicated, press the gasket into the groove.

c. The end of the gasket should be at the TERMINATE GASKET point shown in Figure 3-4.

4. Lower the cover carefully in place and start all the screws through the washers. Do not tighten any of the screws.

5. Use the Electric Torque Screwdriver to tighten all the screws according to the following procedure.

a. Torque all screws to 3 inch-pounds in the numerical sequence as shown in Figure 3-13.

b. Torque all screws to 7 to 9 inch-pounds in the numerical sequence shown in Figure 3-13. Torque value should be the same for all screws.

6. Swing the Output Module back into place using the following procedures:

a. Remove the two screws (H3) from position B.

b. Swing the Output Module partially back into position.

c. Refer to Figure 3-8 and connect J10, J11, and J12.

d. Fasten the two screws (H3) into Position A (Figure 3-9) and fasten the four washers and screws (H1 and H2) back in place.

e. Refer to Figure 3-8 and connect J1, J4, J5, J13, and J14.

7. Install the bottom cover on the instrument.

7D-12. TROUBLESHOOTING

7D-13. The troubleshooting procedures in Section 4 of this manual should allow fault isolation in this option.

7D-14. NON-ROUTINE ADJUSTMENTS

7D-15. There are no non-routine adjustments for thisoption.

7D-16. LIST OF REPLACEABLE PARTS

7D-17. Table 7D-1 lists all replaceable parts for this option. Figure 7D-1 shows the location of each component.

7D-18. SCHEMATIC DIAGRAMS

7D-19. The schematic diagram for this option is located in the 6070A/6071A Schematic Manual.

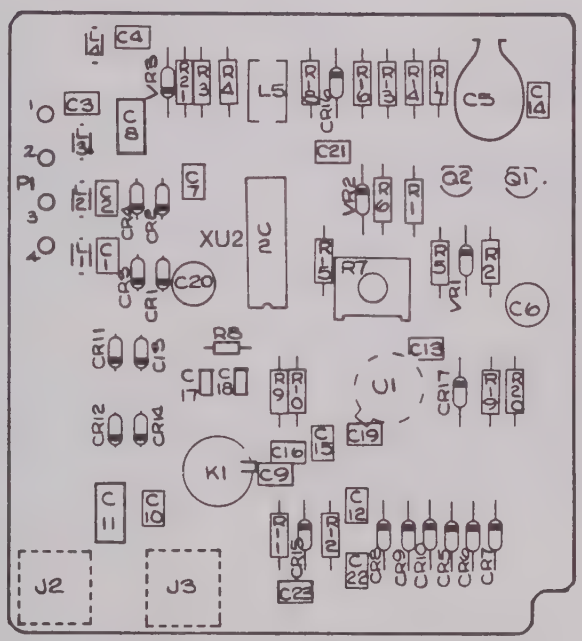
Table 7D-1. Reverse Power Protection Option Assembly

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
	REVERSE POWER PROTECTION OPTION ASSEMBLY FIGURE 7D-1 (6070A-4024T)	ORDER	BY	OPTION 607XA-870			1
C1	CAP, CER, 47 PF +/-2%, 100V	512368	89536	512368	4		
C2	CAP, CER, 47 PF +/-2%, 100V	512368	89536	512368	REF		
C3	CAP, CER, 47 PF +/-2%, 100V	512368	89536	512368	REF		
C4	CAP, CER, 47 PF +/-2%, 100V	512368	89536	512368	REF		
C5	CAP, TA, 22 UF +/-20%, 35V	394775	56289	196D226X0035TE4	1		
C6	CAP, TA, 22 UF +/-20%, 15V	423012	56289	196D226X0015KA1	2		
C7	CAP, CER, 0.005 UF +/-20%, 50V	255471	51642	200-050-601-502M	3		
C8	CAP, ELECT, TA, 4.7 UF +/-1%, 15/18V	519363	56289	193D475X9015C2	2		
C9	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	8		
C10	CAP, CER, 0.005 UF +/-20%, 50V	255471	51642	200-050-601-502M	REF		
C11	CAP, ELECT, TA, 4.7 UF +/-1%, 15/18V	519363	56289	193D475X9015C2	REF		
C12	CAP, CER, 0.005 UF +/-20%, 50V	255471	51642	200-050-601-502M	REF		
C13	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C14	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C15	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C16	CAP, CER, 2.2 PF +/-0.25 PF, 100V	362731	89536	362731	1		
C17	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	2		
C18	CAP, CER, 0.22 UF +/-20%, 50V	309849	71590	CW30C224K	REF		1
C19	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C20	CAP, TA, 22 UF +/-20%, 15V	423012	56289	196D226X0015KA1	REF		
C21	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C22	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
C23	CAP, CER, 0.001 UF +/-20%, 500V	402966	72982	8121-A100-W5R-102M	REF		
CR1	DIODE, SMALL SIGNAL	454181	03508	1N4606	8		1
CR2	DIODE, SMALL SIGNAL	454181	03508	1N4606	REF		1
CR3	DIODE, SMALL SIGNAL	454181	03508	1N4606	REF		1
CR4	DIODE, SMALL SIGNAL	454181	03508	1N4606	REF		1
CR5	DIODE, HI-SPEED SWITCHING	203323	04713	1N4448	6	2	
CR6	DIODE, HI-SPEED SWITCHING	203323	04713	1N4448	REF		
CR7	DIODE, HI-SPEED SWITCHING	203323	04713	1N4448	REF		
CR8	DIODE, HI-SPEED SWITCHING	203323	04713	1N4448	REF		
CR9	DIODE, HI-SPEED SWITCHING	203323	04713	1N4448	REF		
CR10	DIODE, HI-SPEED SWITCHING	203323	04713	1N4448	REF		
CR11	DIODE, SMALL SIGNAL	454181	03508	1N4606	REF		1
CR12	DIODE, SMALL SIGNAL	454181	03508	1N4606	REF		1
CR13	DIODE, SMALL SIGNAL	454181	03508	1N4606	REF		1
CR14	DIODE, SMALL SIGNAL	454181	03508	1N4606	REF		1
CR15	DIODE, LO-CAP, LO-LEAK	369595	07263	FH1100	1	1	
CR16	DIODE, LO-CAP, LO-LEAK	375907	07263	FD7222	2	1	
CR17	DIODE, LO-CAP, LO-LEAK	375907	07263	FD7222	REF		
H1	WASHER, CRESCENT SPRING (NOT SHOWN)	544239	89536	544239	1		
J2	CONNECTOR, RF, SMA	512087	16733	705147-001	2		
J3	CONNECTOR, RF, SMA	512087	16733	705147-001	REF		
K1	RELAY, ARMATURE	528638	11532	712-26	1		1
L1	INDUCTOR, 10-TURN	496448	89536	496448	4		
L2	INDUCTOR, 10-TURN	496448	89536	496448	REF		
L3	INDUCTOR, 10-TURN	496448	89536	496448	REF		

Table 7D-1. Reverse Power Protection Option Assembly (cont)

REF DES	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO.	TOT QTY	REC QTY	NOTE
L4	INDUCTOR, 10-TURN	496448	89536	496448	REF		
L5	INDUCTOR, 6-TURN	320911	89536	320911	1		
P1	COMPONENT LEAD, SPRING TYPE	544056	00779	50871-1	4		
Q1	TRANSISTOR, SI, PNP, SMALL SIGNAL	418707	04713	MPS56562	1	1	
Q2	TRANSISTOR, SI, NPN	218081	04713	MPS6520	1	1	
R1	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	5		
R2	RES, DEP. CAR, 560 +/-5%, 1/4W	385948	80031	CR251-4-5P560E	1		
R3	RES, DEP. CAR, 470 +/-5%, 1/4W	343434	80031	CR251-4-5P470E	2		
R4	RES, DEP. CAR, 470 +/-5%, 1/4W	343434	80031	CR251-4-5P470E	REF		
R5	RES, DEP. CAR, 100 +/-5%, 1/4W	248771	80031	CR251-4-5P100E	1		
R6	RES, DEP. CAR, 2K +/-5%, 1/4W	441469	80031	CR251-4-5P2K	2		
R7	RES, VAR, 500 +/-10%, 1/2W	325613	89536	325613	1	1	
R8	RES, DEP. CAR, 300 +/-5%, 1/4W	512772	80031	CR251-4-5P300E	1		
R9	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R10	RES, DEP. CAR, 2K +/-5%, 1/4W	441469	80031	CR251-4-5P2K	REF		
R11	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R12	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	2		
R13	RES, DEP. CAR, 1.5K +/-5%, 1/4W	343418	80031	CR251-4-5P1K5	1		
R14	RES, DEP. CAR, 680 +/-5%, 1/4W	368779	80031	CR251-4-5P680E	1		
R15	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R16	RES, DEP. CAR, 1.8K +/-5%, 1/4W	441444	80031	CR251-4-5P1K8	1		
R17	RES, DEP. CAR, 7.5K +/-5%, 1/4W	441667	80031	CR251-4-5P7K5	1		
R18	RES, DEP. CAR, 510 +/-5%, 1/4W	441600	80031	CR251-4-5P510E	1		
R19	RES, DEP. CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10K	REF		
R20	RES, DEP. CAR, 1K +/-5%, 1/4W	343426	80031	CR251-4-5P1K	REF		
R21	RES, DEP. CAR, 3.9K +/-5%, 1/4W	342600	80031	CR251-4-5P3K9	1		
U1	IC, LINEAR DIFFERENTIAL COMPARATOR	343343	12040	LM/UA710CH	1	1	
U2	IC, TTL, QUAD S-R LATCH	404210	01295	SN74LS279N	1	1	
VR1	DIODE, ZENER, 4.7V +/-10%	387084	07910	1N750	1	1	
VR2	DIODE, ZENER, 12.0V +/-10%	159780	04713	1N759	1	1	
VR3	DIODE, ZENER, 5.1V +/-5%	159798	04713	1N751A	1	1	
XU2	SOCKET, IC, 16-PIN	276535	91506	316-AG39D	1		

1 BEFORE ORDERING SPARE PARTS OR SPARE PCB ASSEMBLIES, PLEASE CONTACT YOUR NEAREST JOHN FLUKE SERVICE CENTER FOR INFORMATION



6071A-1624

Figure 7D-1. Reverse Power Protection Option Assembly

Appendix A

Manual Change Information

INTRODUCTION

This appendix contains information necessary to backdate the 6070A/6071A Service and Schematic Manuals to conform with the actual pcb configuration of your instrument. To identify the configuration of the pcbs used in your instrument, refer to the revision letter marked in ink on the component side of each pcb assembly. Table A-1 defines the assembly revision levels documented in this manual.

NEWER INSTRUMENTS

As changes and improvements are made to the instrument, they are identified by incrementing the revision letter marked on the affected pcb assembly. These changes are documented on a supplemental change/errata sheet which, when applicable, is inserted at the front of the manual(s).

OLDER INSTRUMENTS

To backdate this manual to conform with earlier assembly revision levels, perform the changes indicated in Table A-1.

CHANGES

The following changes, unless otherwise noted, affect only Section (parts list and component location drawings) of this manual and the 6070A/6071A Schematic Manual. The material affected is easily determined by the type of change. See Table A-2.

Table A-1. Manual Status and Backdating Information

Ref Or Option No.	Assembly Name	Fluke Part No.	* To adapt manual to earlier rev configurations perform changes in desending order (by no.), ending with change under desired rev letter																					
			–	A	B	C	D	E	F	G	H	J	K	L	M	N	P							
A1A1	FRONT PANEL PCB ASSEMBLY	462390		●	●	●	●	●	●	X														
A2A1	CONTROLLER PCB ASSEMBLY	462424		●	●	●	●	●	●	●	X													
A2A4	CONTROLLER MOTHER BOARD	489674		●	●	●	●	X																
A3A1	PHASE DETECTOR PCB ASSEMBLY	463521		+	+	+	+	3	X															
A3A2	10 MHz REFERENCE PCB ASSEMBLY	463646		●	●	●	X																	
A3A3	DELAY DISCRIMINATION PCB ASSEMBLY	463653		+	+	+	+	+	1	X														
A3A4	N/1 DIVIDER PCB ASSEMBLY	463547		●	●	●	X																	
A3A5	VCO RESONATOR PCB ASSEMBLY	463364		●	●	●	●	●	●	X														
A3A6	SINGLE SIDEBAND MIXER PCB ASSEMBLY	463513		●	●	●	●	X																
A3A7	SUB SYNTHESIZER PCB ASSEMBLY	463554		●	●	●	X																	
A3A8	SYNTHESIZER CONTROL PCB ASSEMBLY	463638		●	●	●	●	●	●	●	X													
A3A9	SYNTHESIZER DISTRIBUTION PCB ASSEMBLY	463562		●	●	●	●	●	●	X														
A3A10	MODULATION DISTRIBUTION PCB ASSEMBLY	463570		●	●	●	●	●	X															
A4A2	MODULATION OSCILLATOR PCB ASSEMBLY	469593		●	●	●	X																	
A4A3	ATTENUATOR PCB ASSEMBLY	462432		X																				
A4A4	MODULATOR DIVIDER PCB ASSEMBLY	463596		●	●	●	●	X																
A4A6	X2 OUTPUT AMPLIFIER PCB ASSEMBLY	546465		●	●	●	●	●	●	X														
A4A7	OUTPUT AMPLIFIER PCB ASSEMBLY	463505		●	●	●	●	X																
A4A8	HETRODYNE OSCILLATOR PCB ASSEMBLY	463588		●	●	●	●	●	●	●	X													
A4A9	HETRODYNE CONVERTER PCB ASSEMBLY	463562		●	●	●	●	●	●	X														
A4A10	MODULATION DISTRIBUTION PCB ASSEMBLY	463570		+	+	+	+	2	X															

* X = The PCB revision levels documented in this manual.
● = These revision letters were never used in the instrument.
– = No revision letter on the PCB.
\+ = Change did not affect manual.

Table A-1. Manual Status and Backdating Information (cont)

Ref Or Option No.	Assembly Name	Fluke Part No.	* To adapt manual to earlier rev configurations perform changes in desending order (by no.), ending with change under desired rev letter																					
			–	A	B	C	D	E	F	G	H	J	K	L	M	N	P								
A5A1	POWER SUPPLY PCB ASSEMBLY	457747		●	●	●	X																		
A5A2	POWER SUPPLY REGULATOR PCB ASSEMBLY	457739		●	●	X																			
A5A3	AUXILIARY XFORMER PCB ASSEMBLY	489005		●	X																				
A5A4	INPUT RECTIFIER PCB ASSEMBLY	488486		●	●	X																			
A5A5	SWITCHING XSTR ASSEMBLY	521385		●	X																				
A5A6	POWER SUPPLY CAPACITOR PCB ASSEMBLY	520957		●	●	●	X																		
A6A1	IEEE CONNECTOR PCB ASSEMBLY	457903		X																					
A6A2	SERIES PASS MOTHER BOARD ASSEMBLY	489591		●	●	X																			
A6A3	+5V SERIES PASS PCB ASSEMBLY	489617		●	X																				
A6A4	+12V, -12V, +24V SERIES PASS PCB ASSY.	489641		●	●	X																			
-570	NON VOLATILE PCB ASSEMBLY	463349		●	●	●	X																		
-870	RESERVE POWER PROTECTION PCB ASSEMBLY	463489		●	●	●	●	●	●	●	X														

* X = The PCB revision levels documented in this manual.
● = These revision letters were never used in the instrument.
– = No revision letter on the PCB.
\+ = Change did not affect manual.

Table A-2. Material Affected By a Change

TYPE OF CHANGE	MATERIAL AFFECTED = •		
	Parts List	Schematic	Component Location
Electrical Value	•	•	
Part Number	•		
Hardware	•		•
Size/Location (physical)			•
Addition/Deletion (electrical)	•	•	•

Change #1 19195
A3A3 Delay Discriminator PCB Assembly

Change C92
FROM: 234492/ 73445/ C280MAE/A33K
TO: 357954/ 73445/ C280MAE/A610K

Change #2 15207
A4A10 Modulation Distribution PCB Assembly

Change R30 and R32
FROM: RES, MTL. FILM, 7.68k ±1%, 1/8W/ 370999/ 91637/ CMF557681F
TO: RES, MTL. FILM, 10k ±1%, 1/8W / 168260/ 91637/ CMF551002F

Change #3 15390
A3A1 Phase Detector PCB Assembly

Change R7
FROM: RES, MTL. FILM, 2.00k ±1%, 1/8W/ 235226/ 91637/ CMF552001F
TO: RES, MTL. FILM, 2.15k ±1%, 1/8W/ 293712/ 91637/ CMF552151F

Change R6
FROM: RES, DEP. CAR., 220k ±5%, 1/4W/ 348953/ 80031/ CR251-4-5P220K
TO: RES, COMP, 100k ±5%, 1/4W / 348920/ 01121/ CB1045

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Tel: (2) 736-2888, TLX: AA25887

Elmeasco Instruments Pty Ltd.
P.O. Box 107
Mt. Waverly, VIC. 3149
Australia
Tel: 233-4044
TLX: 36206 (ELMVIC)

Elmeasco Instruments Pty Ltd.
Professional Suite's Bldg.
G.P.O. Box 2360
Brisbane, 4001, Australia
Tel: (07) 229-3161

Elmeasco Instruments Pty Ltd.
P.O. Box 1240
G.P.O. Adelaide 5001
South Australia

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P.O.Box 95, Gosnells
West Australia 6110
Tel: (09) 348-3362

Austria ■
Walter Rekirsch
Elektronische Gerate GmbH & Co.
Vertrieb-KG., Obachgasse 28
A-1220 Vienna, Austria
Tel: (0222) 235555, TLX: 134759

Bahrain ■
AL-Hamidiya
P.O. Box 20074
Manama, Bahrain
Tel: 259958, TLX: 8895

Bangladesh ●
Motherland Corporation
24 Hatkhola Rd., Tikatuli
Dacca 3, Bangladesh
Tel: 257249, 255776

Belgium ■
Fluke (Belgium) S.A./N.V.
6, Rue de Geneve
1140 Brussels, Belgium
Tel: (2) 2164090, TLX: 26312

Bolivia ●
Coasin Bolivia S.R.L.
Casilla 7295, La Paz, Bolivia
Tel: 40962, TLX: 5255

Brazil ●
Fluke Brasil-Industria E
Commercio LTDA
Al. Amazonas 422,
Alphaville, Barueri,
CEP 06400 Sao Paulo, Brazil
Tel: (011) 421-3603

Brunei ●
Rank O'Connor's (PTE) Limited
No. 8, BK.D
Surfri Shop House Complex
Mile 1, Jalong Tutong
Bandar Seri Begawan, Brunei
Tel: 26680

Bulgaria ■
Amtest Associates Ltd.
P.O. Box 55
Addlestone, Surrey KT15 1DU
United Kingdom
Tel: Weybridge (932) 52121
TLX: 928855

Canada ●
Allan Crawford Assoc., Ltd.
#14 1935 30th Ave. N.E.
Calgary, Alberta T2E 6Z5
Tel: (403) 230-1341, TLX: 03-821186

Allan Crawford Assoc., Ltd.
Suite 1, Box 60
Edmonton, Alberta T5L 4H8
Tel: (403) 451-4893

Allan Crawford Assoc., Ltd.
3795 William Street
Burnaby, British Columbia V5C 3H3
Tel: (604) 294-1326, TLX: 04-54247

Allan Crawford Assoc., Ltd.
192 Joseph Zatzman Dr.
Suite 4
Burnside Industrial Park
Dartmouth, Nova Scotia B3B 1N4
Tel: (902) 463-8640, TLX: 01931604

Allan Crawford Assoc., Ltd.
881 Lady Ellen Place
Ottawa, Ontario K1Z 5L3
Tel: (613) 722-7682, TLX: 0533600

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6503 Northam Drive
Mississauga, Ontario L4V 1J5
Tel: (416) 678-1500, TLX: 06968769

Allan Crawford Assoc., Ltd.
7918 cote de Liesse
St. Laurent, Quebec H4T 1E7
Tel: (514) 731-8564, TLX: 05824944

Chad ■
Fluke (Holland) B.V.
P.O. Box 5053, 5004 EB Tilburg
Zevenheuvelenweg 53, 5048 AN Tilburg
The Netherlands
Tel: (013) 673973, TLX: 52237

Chile ●
Intronica Chile Ltda.
Manuel Montt 024 - Of. D
Casilla 16228, Santiago 9, Chile
Tel: 44940
TLX: No 40301 Cab. Publ.,
Attn: Intronica Chile

China, People's Republic of ●
Fluke International Corporation
P.O. Box C9090
Everett, WA 98206, U.S.A.
Tel: (206) 356-5511
TLX: 152662 JOHN FLUKE EVT

Colombia ●
Sistemas E Instrumentacion, Ltda.
Carrera 13, No. 37-43, Of. 401
Ap. Aereo 29583
Bogota DE, Colombia SA
Tel: 232-45-32, TLX: 45787

Cyprus ■
Chris Radiovision Ltd.
P.O. Box 1989, Nicosia, Cyprus
Tel: 66121, TLX: 3495

Czechoslovakia ■
Amtest Associates Ltd.
P.O. Box 55
Addlestone, Surrey KT15 1DU
United Kingdom
Tel: Weybridge (932) 52121
TLX: 928855

Denmark ■
Tage Olsen A/S
Ballerup Byvej 222
DK - 2750 Ballerup, Denmark
Tel: (2) 658111, TLX: 35293

Ecuador ●
Proteco Coasin Cia., Ltda.
Edificio "Jerico"
Ave. 12 de Octubre #2285 y
Ave. Orellana (Planta Baja)
Quito, Ecuador
Tel: 529684, TLX: 2865 Protec Ed

Proteco Coasin Cia., Ltda.
Calderon 103Y Malecon
Casilla #9733
Guayaquil, Ecuador
Tel: 526093

Egypt and Sudan ■
Electronic Engineering Liaison Office
P.O. Box 2891 Horreya
11 Ahmed Khashara St.
Hegas Square
Heliopolis, Cairo, Egypt
Tel: 691588, TLX: 92502

Ethiopia ■
Fluke (Holland) B.V.
P.O. Box 5053, 5004 EB Tilburg
Zevenheuvelenweg 53, 5048 AN Tilburg
The Netherlands
Tel: (013) 673973, TLX: 52237

Fiji ●
AWA Fiji
P.O. Box 858
47 Forster Road, Walu Bay
Suva, Fiji
Tel: 312079, TLX: FJ2347

Finland ■
Oy Findip AB, Teollisuustie 7
02700 Kauniainen, Finland
Puh: (0) 5052255
TLX: 123129

France ■
M.B. Electronique S.A.
Rue Fourny 606, Z1 Centre
78530 BUC
B.P. No. 31
78530 BUC, France
Tel: (3) 9568131, TLX: 695414

German Democratic Republic ■
Amtest Associates Ltd.
P.O. Box 55
Addlestone, Surrey KT15 1DU
United Kingdom
Tel: Weybridge (932) 52121
TLX: 928855

German Federal Republic ■
Fluke (Deutschland) GmbH
Max-Hueber StraBe 8
8045 Ismaning, West Germany
Tel: (089) 96251, TLX: 522472
Rapifax: (089) 966718

Fluke (Deutschland) GmbH
Meineckestrasse 53
4000 Dusseldorf 30, West Germany
Tel: (0211) 450831, TLX: 8585576

Fluke (Deutschland) GmbH
Oberer Kirchhaldenweg 135
7000 Stuttgart 1, West Germany
Tel: (0711) 694091, TLX: 722518

Fluke (Deutschland) GmbH
Hubertusallee 46
1000 Berlin-33, West Germany
Tel: (030) 8911090
TLX: 0184978

Greece ■
Hellenic Scientific Representations Ltd.
11, Vrasside Street
Athens 612, Greece
Tel: (1) 711140, TLX: 219330

Hong Kong ●
Schmidt & Co. (H.K.) Ltd.
28th F1. Wing on Centre
111 Connaught Road
Central Hong Kong
Tel: 5-455644
TLX: 74766 SCHMC HX

Hungary ■
Amtest Associates Ltd.
P.O. Box 55
Addlestone, Surrey KT15 1DU
United Kingdom
Tel: Weybridge (932) 52121
TLX: 928855

Iceland ●
Kristjan O. Skagfjord Ltd.
P.O. Box 906
Reykjavik, Iceland
Tel: 24120, TLX: 2133

India ●
Hinditron Services Pvt. Ltd.
69/A.L. Jagmohandas Marg
Bombay 400 006, India
Tel: 811316,
TLX: 112326 Hspl In

Hinditron Services Pvt. Ltd.
33/44-A 8th Main Road
Raj Mahl Vilas Extension
Bangalore 560 080, India
Tel: 33139
TLX: 0845741

Hinditron Services Pvt. Ltd.
Shantiniketan, Office No.6
6th Floor, 8 Camac Street
Calcutta 700 017, India
Tel: 434032, 447541

Hinditron Services Pvt. Ltd.
15 Community Centre, Panchshila Park
New Delhi 110 017, India
Tel: 653397

Hinditron Services Pvt. Ltd.
Srinath Complex, 5th Floor
1-1-58/1 to 1-1-58/11
Sarojini Devi Road
Secunderabad 500 003, India
Tel: 61705

Indonesia ●
P.T. Dwi Tunggal Jaya Sakti
Sangga Buana Bldg., 1st Floor
Jl. Senen Raya 44, P.O. Box 4435
Jakarta, Indonesia
Tel: 367390-9, TLX: 46624

Iran ■
Fluke (Holland) B.V.
P.O. Box 5053, 5004 EB Tilburg
Zevenheuvelenweg 53, 5048 AN Tilburg
The Netherlands
Tel: (013) 673973, TLX: 52237

Iraq ■
Fluke (Holland) B.V.
P.O. Box 5053, 5004 EB Tilburg
Zevenheuvelenweg 53, 5048 AN Tilburg
The Netherlands
Tel: (013) 673973, TLX: 52237

Ireland ■
Euro Electronics
32 Brews Hill
Naven County Meath, Ireland
Tel: (46) 23577, TLX: 3182

Israel ■
R.D.T. Electronics Engineering Ltd.
P.O. Box 75
46, Sokolov Street
Ramat Hasharon 47235, Israel
Tel: (3) 483216, TLX: 32143

FLUKE®

John Fluke Mfg. Co., Inc., P.O. Box C9090, Everett, WA 98206. Phone (206) 342-6300
Fluke (Holland) B.V., P.O. Box 5053, 5004 EB, Tilburg, The Netherlands. Phone (013) 673973

Litho in U.S.A. 12/81

Taiwan
Schmidt Scientific Far East Ltd.
906, Chia Hsin Bldg.
96 Chung Shan Rd, N.Sec. 2
Taipei, Taiwan
Tel: 5831604

Thailand
Measuretronix Ltd.
1899/10 Ramkamhaeng Rd.
Huamark, Bangkok 24
Thailand
Tel: 3143369

Turkey
Erkman Elektronik Aletler
Ticaret Anonim Sirketi
Necatiby Cad 92/3
Karakoy, Istanbul, Turkey
Tel: 09-44-1-5461

United Kingdom
Fluke (GB) Ltd.
Colonial Way
Watford, Herts, WD2 4TT
United Kingdom
Tel: 09-4492340511

Uruguay
Coasin Uruguaya S.R.L.
Casilla de Correos 1400
Correo Central
Montevideo, Uruguay
Tel: 29-31-95

Venezuela
Coasin C.A.
Calle 9 Con Calle 4
Edif. Edinurbi
Apartado de Correos Nr-70. 136
Los Ruices
Caracas 1070-A, Venezuela
Tel: 387842

West Germany
Fluke (Deutschland) GmbH
Max-Hueber Strasse 8
8045 Ismaning
West Germany
Tel: (089) 96251

Italy ■
Sistrel S.p.A.
Via Giuseppe Armellini No. 37
00143 Rome, Italy
Tel: (6) 5915551, TLX: 68356

Sistrel S.p.A.
Via Pelizza da Volpedo 59
20092 Cinisello besamo
Milan, Italy
Tel: (2) 6181893, TLX: 334643

Sistrel S.p.A.
Via Cintia Parco S. Paolo 35
80126 Naples, Italy
Tel: (81) 7679700

Japan ●
John Fluke Mfg. Co., Inc.
Japan Branch
(PC Board Testers only)
1 Higashikata-machi
Midori-ku
Yokohama 226, Japan
Tel: (045) 473-5425
TLX: 3823-666 FLKJPJ

Tokyo Electron Ltd.
38 FL Shinjuko Nomura Bldg.
1-26-2, Nishi-Shinjuku
Shinjuku-ku
Tokyo 160, Japan
Tel: 03-343-4411, TLX: 2322220

Kenya ●
ADCOM Ltd.
P.O. Box 30070
Nairobi, Kenya, East Africa
Tel: 331955, TLX: 22639

Korea ●
Electro-Science Korea Co.
C.P.O. Box 8446
Room 201, Boondo Bldg.
56-12 Jangchung-IKa
Jung-ku
Seoul, Korea
Tel: 261-7702, TLX: K25381

Kuwait ■
Tareq Company
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Kuwait, Arabian Gulf
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Lebanon and Jordan ■
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Fluke (Holland) B.V.
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Zevenheuvelenweg 53, 5048 AN Tilburg
The Netherlands
Tel: (013) 673973, TLX: 52237

Malaysia ●
Rank O'Connor's (PTE) Limited
P.O. Box 91, Petaling Jaya
Selangor, West Malaysia
Tel: 566599
TLX: OCONOR MA37649

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Lot No. 5 Taman Mesra
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Tel: 55322, TLX: MA80286

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Christensen S.A.
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Mainvest
Residence Moulay Ismail, Bat. C.
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Rabat, Morocco
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Netherlands ■
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Tel: 960744, TLX: 20202

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Morgenstierne & Co A/S
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P.O. Box 6688, Rodelokka
Oslo 5, Norway
Tel: (2) 356110, TLX: 71719

Pakistan ●
Pak International Operations
505 Muhammadi House
I.I. Chundrigar Road
P.O. Box 5323, Karachi, Pakistan
Tel: 221127, TLX: 24494

PDR Yemen ■
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Zevenheuvelenweg 53, 5048 AN Tilburg
The Netherlands
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Phillipines ●
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P.O. Box 610, Greenhills, San Juan
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Poland ■
Amtest Associates Ltd.
P.O. Box 55
Addlestone, Surrey KT15 1DU
United Kingdom
Tel: Weybridge (932) 52121
TLX: 928855

Portugal ■
Decada-Equipamentos de
Electronica, Lda.
Rue Pedro Nunes, 47-C
1000 Lisboa
P.O. Box 1128, 1003 Lisboa Codex
Tel: (19) 574984, TLX: 18469

Qatar ■
Technology Organisation
P.O. Box 5549, Doha, Qatar
Tel: 321431, TLX: 4581

Romania ■
Amtest Associates Ltd.
P.O. Box 55
Addlestone, Surrey KT15 1DU
United Kingdom
Tel: Weybridge (932) 52121
TLX: 928855

Saudi Arabia ■
Electronic Equipment Marketing Co. Ltd.
P.O. Box 3750
Riyadh, Saudi Arabia
Tel: (1) 4032761, TLX: 201120

Singapore ●
Rank O'Connor's (PTE) Limited
98 Pasir Panjang Road
Singapore 0511
Republic of Singapore
Tel: 637944
TLX: OCONSIN RS21023

Somalia ■
Fluke (Holland) B.V.
P.O. Box 5053, 5004 EB Tilburg
Zevenheuvelenweg 53, 5048 AN Tilburg
The Netherlands
Tel: (013) 673973, TLX: 52237

South Africa ●
Fluke S.A. (Pty) Ltd.
P.O. Box 39797, Bramley 2018
Republic of South Africa
Tel: (011) 786-3170, TLX: 424328

Spain ■
Hispano Electronica S.A.
Poligono Industrial Urtinsa
Apartado de Correos 48
Alcorcon (Madrid), Spain
Tel: (1) 6194108
TLX: 22404/42634

Sri Lanka ●
Jay-Es Electronics
160 Poorvarama Mawatha
Colombo 5, Sri Lanka
Tel: 073-2393

Sweden ■
Teleinstrument AB
P.O. Box 4490
162 04 Vallingby, Sweden
Tel: (8) 380370, TLX: 11347

Switzerland ■
Traco Electronic AG
Jenatschstrasse 1
8002 Zurich, Switzerland
Tel: (1) 2010711, TLX: 54318

Syria ■
Mabek (Electronic Division)
P.O. Box 4238
Damascus, Syria

Taiwan ●
Schmidt Scientific Far East Ltd.
906, Chia Hsin Bldg.
96, Chung Shan N. Rd., Sec. 2
Taipei, Taiwan,
Tel: 5817393/5814976
TLX: 11111

Thailand ●
Measuretronix Ltd.
1899/10 Ramkamhaeng Rd.
Huamark, Bangkok, Thailand
Tel: 3143369, TLX: 81143

Tunesia ■
Selep S.A.R.L.
6, Rue de Sparte
Tunis - 1000 RP, Tunesia
Tel: (1) 248093, TLX: 13030

Turkey ■
Erkman Elektronik Aletler
Ticaret Anonim Sirketi
Necatibey Cad 92/3
Karakoy, Istanbul, Turkey
Tel. (1) 5461
TLX: 23353

United Arab Emirates ■
Al-Sanani Ge. Trad. Est.
P.O. Box 7187
Abu-Dhabi, United Arab Emirates
Tel: 828428/821370/821371/
TLX: 23966

United Kingdom ■
Fluke (Great Britain) Ltd.
Colonial Way
Watford, Herts, WD2 4TT
United Kingdom
Tel: (0923) 40511, TLX: 934583
Rapifax: (0923) 25067

Uruguay ●
Coasin Uruguaya S.R.L.
Cuareim 2196
Casilla de Correos 1400
Correo Central
Montevideo, Uruguay
Tel: 29-31-95, TLX: UY5671

U.S.S.R. ■
Amtest Associates Ltd.
P.O. Box 55
Addlestone, Surrey KT15 1DU
United Kingdom
Tel: Weybridge (932) 52121
TLX: 928855

Venezuela ●
Coasin, C.A.
Calle 9 Con Calle 4, Edif. Edinurbi
Piso 3, La Urbina
Apartado De Correos
NR-70.136 Los Ruices
Caracas 1070A, Venezuela
Tel: 38-78-42, TLX: 21027 Emven Ve

Yemen ■
Fluke (Holland) B.V.
P.O. Box 5053, 5004 EB Tilburg
Zevenheuvelenweg 53, 5048 AN Tilburg
The Netherlands
Tel: (013) 673973, TLX: 52237

Yugoslavia ■
Amtest Associates Ltd.
P.O. Box 55
Addlestone, Surrey KT 15 1DU
United Kingdom
Tel: Weybridge (932) 52121
TLX: 928855

■ Supplied and Supported by —
Fluke (Holland) B.V.
P.O. Box 5053, Zevenheuvelenweg 53
5004 EB Tilburg, Netherlands
Tel: (013) 673973, TLX: 52237

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Fluke International Corporation
P.O. Box C9090
Everett, WA 98206 U.S.A.
Tel: (206) 356-5500
TLX: 152662 JOHN FLUKE EVT

John Fluke Mfg. Co., Inc., P.O. Box C9090, Everett, WA 98206. Phone (206) 342-6300
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Fluke Technical Center
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Santa Clara, CA 95050
(408) 727-8121

CO, Denver
Fluke Technical Center
1980 S. Quebec St., Unit 4
Denver, CO 80231
(303) 750-1228

FL, Orlando
Fluke Technical Center
940 N. Fern Creek Avenue
Orlando, FL 32803
(305) 896-2296

IL, Rolling Meadows
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1400 Hicks Road
Rolling Meadows, IL 60008
(312) 398-5800

MA, Burlington
Fluke Technical Center
25 "B" Street
Burlington, MA 01803
(617) 273-4678

MD, Rockville
Fluke Technical Center
5640 Fishers Lane
Rockville, MD 20852
(301) 770-1576

NJ, Paramus
Fluke Technical Center
West 75th Century Road
Paramus, NJ 07652
(201) 262-9550

TX, Dallas
Fluke Technical Center
14400 Midway Road
Dallas, TX 75240
(214) 233-9945

WA, Everett
Fluke Technical Center
6920 Seaway Blvd.
Everett, WA 98206
(206) 356-5560

ALB, Calgary
Allan Crawford Assoc., Ltd.
#14 1935 30th Ave. N.E.
Calgary, Alberta T2E 6Z5
(403) 230-1341

ONT, Mississauga
Allan Crawford Assoc., Ltd.
6503 Northam Drive
Mississauga, Ontario 1.4V IJ2
(416) 678-1500

QUE, Montreal
Allan Crawford Assoc., Ltd.
7018 Cote de Liesse
Montreal, Quebec H4T IE7
(514) 731-8564

B.C., Burnaby
Allan Crawford Assoc. Ltd.
3795 William St.
Burnaby, B.C. V5C 3H3
(604) 294-1326

Other Areas

Argentina
Coasin S.A.
Virrey del Pino 4071
Buenos Aires, Argentina
Tel: 522-5248

Australia
Elmeasco Instruments Pty Ltd.
P.O. Box 30
Concord, N.S.W.
Australia 2137
Tel: (02) 736-2888

Australia
Elmeasco Instruments Pty. Ltd.
P.O. Box 107
Mr. Waverly, VIC 3149
Australia
Tel: (03) 2334044

Australia
Elmeasco Instruments Pty. Ltd.
GPO Box 2360
Brisbane, Queensland 4001
Australia
Tel: (07) 229-3161

Austria
Walter Rekirsch
Elektronische Gerate GmbH & Co.
Vertriebs-KG., Obachgasse 28
A-1220 Vienna, Austria
Tel: (0222) 235555

Belgium
Fluke (Belgium) S.A./N.V.
6, Rue de Geneve
1140 Brussels, Belgium
Tel: 09-32-2-2164090

Brazil
Fluke Brasil-Industria e Comercio Ltda.
Al. Amazonas 422, Alphaville, Barueri
CEP 06400 Sao Paulo, Brazil
Tel: (011) 421-3603

Chile
Intronica Chile Ltda.
Casilla 16228
Santiago 9, Chile
Tel: 44940

China, Peoples Republic of
Beijing Radio Research Institute
Dianmen East Avenue 89
Beijing, China
Tel: 445612

Colombia
Sistemas E Instrumentacion, Ltda.
Carrera 13, No. 37-43, Of. 401
Ap. Aero 29583
Bogota DE, Colombia S.A.
Tel: 232-45-32

Denmark
Tage Olson A/S
Ballerup Byvej 222
DK-2750 Ballerup
Denmark
Tel: 09-45-2-658111

Ecuador
Proteco Coasin Cia., Ltda.
Edificia "Jerico"
Ave. 12 de Octubre #2285 y
Ave. Orellana (Planta Baja)
Quito, Ecuador
Tel: 526759

Egypt and Sudan
Electronic Engineering Liaison Office
11 Ahmed Khashaba Street
Hegas Square
Heliopolis, Cairo, Egypt
Tel: 691588

Finland
Oy Findip AB
Teollisuustie 7
02700 Kauniainen
Finland
Tel: 09-358-0-502255

France
M.B. Electronique S.A.
Rue Fourny
ZAC de BUC
B.P. No. 31
78530 BUC, France
Tel: 09-33-1-9568131

Greece
Hellenic Scientific
Representations Ltd.
11, Vrassida Street
Athens 612, Greece
Tel: 09-30-1-711140

Hong Kong
Schmidt & Co (H.K.) Ltd.
28th Fl. Wing On Centre
111 Connaught Road
Central Hong Kong
Tel: 5-455644

India
Hinditron Services Pvt. Ltd.
Field Service Centre
8th Main Road
33/44-A Raj Mahal Vilas Extn.
Bangalore 560 080, India
Tel: 33139

India
Hinditron Services Pvt. Ltd.
69/A.L. Jagmohandas Marg
Bombay 400 006, India
Tel: 811316

India
Hinditron Services Pvt. Ltd.
15, Community Centre
Panchshila Park
New Delhi, India 110-017
Tel: 619118

Israel
R.D.T. Electronics Engineering Ltd.
P.O. Box 75
46, Sokolov Street
Ramat Hasharon 47235
Israel
Tel: 09-972-3-483211

Italy
Sistrel S.p.A.
Via Pelizza da Volpedo 59
20092 Cinisello Besamo
Milan, Italy
Tel: (2) 6181893

Italy
Sistrel S.p.A.
Via Giuseppe Armellini No. 37
00143 Rome, Italy
Tel: 09-39-6-5915551

Japan
John Fluke Mfg. Co., Inc.
Japan Branch
1 Higashikata-machi
Midori-ku
Yokohama 226, Japan
Tel: (045) 473-5428

Korea
Electro-Science Korea Co.
C.P.O. Box 8446
Room 201, Boondo Bldg.
56-12, Gangchung-1 Ka
Gung-Ku
Seoul, Korea
Tel: 261-7702

Malaysia
Rank O'Connor's (Malaysia) SDN. BHD.
P.O. Box 91
Petaling Jaya, Selangor
West Malaysia
Tel: 566599

Mexico
Christensen S.A.
Guillermo Prieto 76-304
Col. San Rafael
Delegacion Cuahutemoc
06470-Mexico, D.F.
Tel: 546-25-95

Netherlands
Fluke (Nederland) B.V.
Zonnebaan 39
3606 CH Maarssen, The Netherlands
P.O. Box 225
3600 AE Maarssen, The Netherlands
Tel: (030) 436514

New Zealand
McLean Information Technology Ltd.
P.O. Box 18065
Glen Innes
Auckland 6, New Zealand
Tel: 587-037

Norway
Morgenstierne & Co. A/S
Konghellegate 3
P.O. Box 6688, Rodelokka
Oslo 5, Norway
Tel: 09-47-2-356110

Pakistan
Pak International Operations
505 Muhammadi House
I.I. Chundrigar Road
P.O. Box 5323
Karachi-2 Pakistan
Tel: 221127/239052

Peru
Importaciones Y Representaciones
Electronicas S.A.
Avda. Franklin D. Roosevelt 105
Lima 1, Peru
Tel: 288650

Philippines
Spark Radio and Electronics Corp.
P.O. Box 610 Greenhills
Metro Manila, Philippines 3113
Tel: 78-78-16

Portugal
Equipamentos de Laboratorio, Ltda.
P.O. Box 1128
Lisbon 1000, Portugal
Tel: 09-351-19-574984

Republic of Singapore
Rank O'Connor's (PTE) Ltd.
98 Pasir Panjang Road
Singapore 0511
Republic of Singapore
Tel: 637944

Republic of South Africa
Fluke S.A. (Pty) Ltd.
P.O. Box 39797
Bramley 2018
Republic of South Africa
Tel: (011) 786-3170

Spain
Hispano Electronics S.A.
Apartado de Correos 48
Alcorcon (Madrid)
Spain
Tel: 09-34-1-6194108

Sweden
Teleinstrument AB
P.O. Box 4490
S-162 04 Vallingby 4
Sweden
Tel: -09-46-8-380370

Switzerland
Traco Electronic AG
Jenatschstrasse 1
8002 Zurich
Switzerland
Tel: 09-41-1-2010711

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